Coal Age

JULY, 1955

A McGRAW-HILL PUBLICATION — PRICE 50¢

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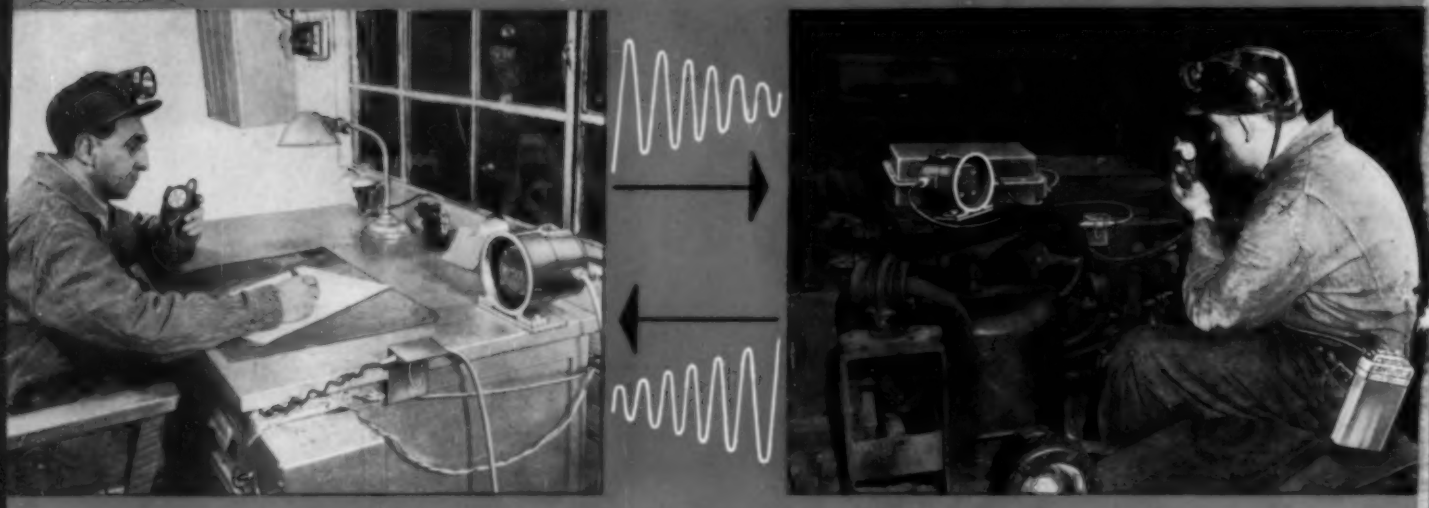
How Kramer Mine Serves New Customers . . . p 64

Continuous Mining for High Output at Compass . . . p 50

Use the NEW M·S·A MinePhone



to BOOST the EFFICIENCY of your EXISTING HAULAGE SYSTEM

A growing number of mine operators, faced with the problem of increased production "out-running" existing haulage facilities, are finding an economical solution in M·S·A MinePhone installations.

This modern communication system, redesigned and greatly improved, permits operators to *safely* step-up present haulage operations to handle increasing tonnage output and offset major investments for new haulage equipment at the same time.

Because the M·S·A MinePhone provides clear, instant two-way voice communication, all haulage decisions are made quickly. The dispatcher is always in contact with motormen, maintenance repair shops, loading points. Motormen can reply while trips are in motion—trips keep on the move, waits on sidings are minimized. Repair needs are relayed quickly. Over-all safety is improved because one message alerts all personnel at once.

We will be happy to demonstrate these, and other advantages, at your convenience. Write or call.

Here are the quality components of a single MinePhone Station

(1) HEAVY-DUTY SPEAKER—made of weather-resistant cast aluminum. Volume control built into housing. (2) PRESS-TO-TALK MICROPHONE—high quality transmission; molded neoprene case; Koiled Kord for safety. (3) RECEIVER-TRANSMITTER—single unit, compact. "Squelch" control maintains quiet when not in use, eliminates background noise. Dust-tight steel housing with mounting cradle for quick installation. (4) RESISTOR BOX—reduces trolley wire DC power to requirements for station. (5) IN-LINE POWER FUSE—combination power cut-off and fuse. Waterproof, dust-tight, molded neoprene case houses a 600 volt 3 amp. fuse. All parts built for rugged, long-life service.

MSA
SAFETY EQUIPMENT HEADQUARTERS

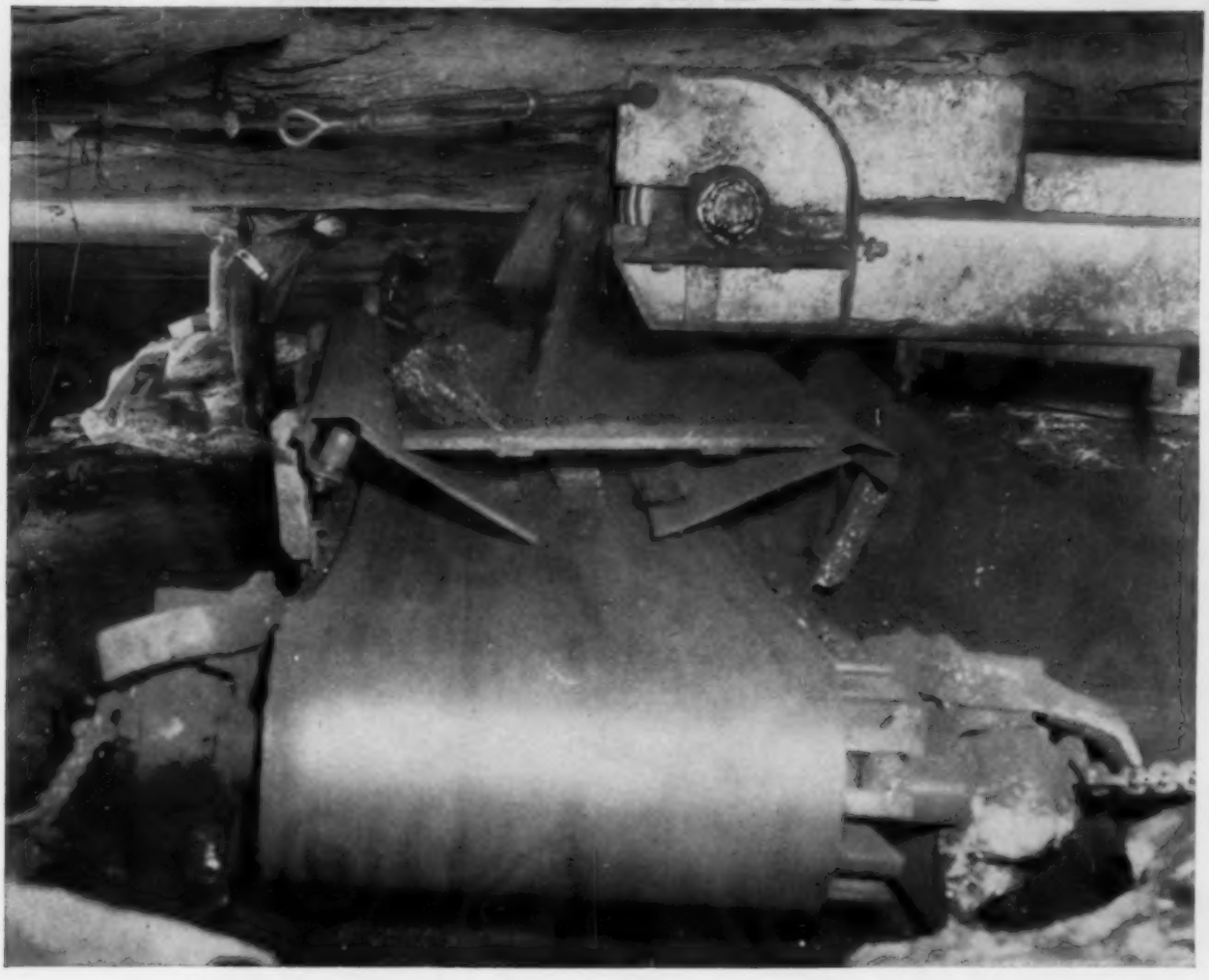
MINE SAFETY APPLIANCES COMPANY
201 North Braddock Avenue, Pittsburgh 8, Pa.
At Your Service: 76 Branch Offices in the United States

MINE SAFETY APPLIANCES CO. OF CANADA, LTD.
Toronto, Montreal, Calgary, Edmonton, Winnipeg, Vancouver, Sydney, N.S. • Representatives in Principal Cities in Mexico, Central and South America

Cable Address "MINSAF" Pittsburgh

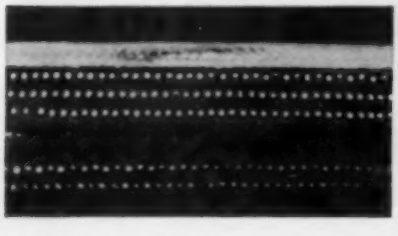
When you have a Safety problem, M.S.A. is at your service.

RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER



Mildew-resisting cord belt lasts 2½ times longer in "wet" mine

THAT belt has just run through water on its return from hauling chunks of coal to the mine railway. Wet operations like this cause mildew which quickly spreads across ordinary belts weakening them to the breaking point. There are two reasons why this can't happen to a B. F. Goodrich cord belt.



In this B. F. Goodrich belt there are plies of parallel cords, running lengthwise, built into both the top and bottom of the belt. Each cord is completely surrounded by rubber—no cross threads tie them together (see cross section). A cut in belt admits moisture or damaging acid to only those few cords exposed. There are no cross cords to wick moisture across belt width. No other conveyor belts are made like this.

As an added protection, B. F. Goodrich cord belts are treated with mildew inhibitors. These chemicals act directly on fungus spores, effectively protect belts against mildew.

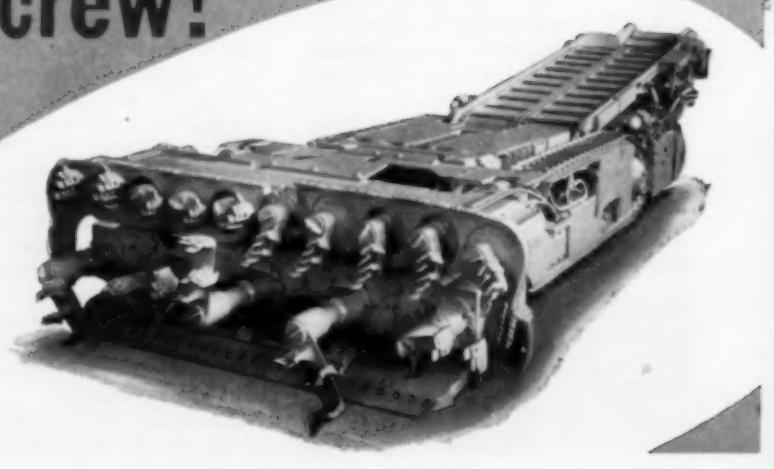
That's why the B. F. Goodrich belt in the picture was chosen by the mine operators. And it has paid off. The belt has carried 3½ million tons over an 11 year period. Other belts on this same job lasted only 4 years.

If exposure to moisture and mine acids is shortening the life of your coal-handling belts, you need a B. F. Goodrich *cord* belt. Let your BFG distributor show you how these longer-lasting conveyor belts can save you money. *The B. F. Goodrich Company, Dept. M-457 Akron 18, Ohio.*

B.F.Goodrich
INDUSTRIAL PRODUCTS DIVISION

in its first 38 days, a new JEFFREY 76-AM COLMOL PATENTED mined 25,585 tons* in 76 shifts . . . in low coal 38″ to 44″ high . . . with a crew of only 7 men . . . an average of 336.7 tons per shift or 48.1 tons for every man charged to the COLMOL crew!

*All tonnages cited are for clean coal. Raw coal mined ran 5% more.



On March 21, a new Jeffrey 76-AM COLMOL began production at a progressive mine working a coal seam 38" to 44" high. Even though crews were trained right on the job, this low-vein continuous mining machine achieved the outstanding tonnages shown.

Remember, these were the *first* 38 production days, with records kept from the minute the new COLMOL made its first lift. Even better averages are now being set as crews become skilled teams and the COLMOL hits the high-stepping stride for which it was designed.

During the first 38-day period, shift peaks were hit of 470, 480, 490, 500 and 520 tons. Just 7 men were charged to each COLMOL crew. Note in column at right how tonnage totals began to climb as crews gained experience. On May 12 (the 39th day) one crew mined 625 tons!

The 76-AM was the second COLMOL installed at this mine. The first COLMOL, with experienced crews, mined 31,195 tons in 76 shifts during the same 38-day period. Average for the older COLMOL was 410.5 tons per shift or 58.6 tons for every man charged to the 7-man crews.

Such production proves this fact: the COLMOL produces high tonnage per man-shift from the very first day of operation. With tons-per-man-shift averages like 48.1 for new crews . . . and 58.6 for veteran crews . . . the COLMOL is your very best bet for low vein continuous mining.

DESCRIPTION OF MINE: Seam varies from 38 to 44 inches. Seam is relatively flat with firm top. At times a weak drawslate up to 6 inches thick comes with the coal. Above this the vein top is firm.

MINING METHOD: Series of 9 headings is advanced. Headings are driven about 25 feet wide on three lifts. COLMOL advances in single pass to depth of 30 feet, backs up and makes second and third passes to same depth. Cycle is repeated after 30 feet of conveyor line is added. Breakthroughs are driven in two lifts, 18 feet wide every 60 feet. After air is established by alternating in driving up #1 and #2 headings for 300 feet, the COLMOL moves to #3 and advances it 300 feet. The remaining headings are driven similarly to #3. Headings are spaced on 60-foot centers.

COLMOL is supported by a loader to which a bridge conveyor is attached. Bridge conveyor discharges on to chain conveyor. Chain is advanced in 7-pan or 42-foot increments. Coal then dumps on cross chain conveyor which feeds mother belt line.

COLMOL CREW: 1 COLMOL Operator, 1 Loader Operator, 1 Helper, 1 Timberman, 1 Supplyman, 1 Mechanic, 1 Foreman. TOTAL: 7 Men.

Write Mining Sales Division, The Jeffrey Manufacturing Co., Columbus 16, Ohio, for COLMOL Bulletin 877.

TWO-SHIFT TOTALS

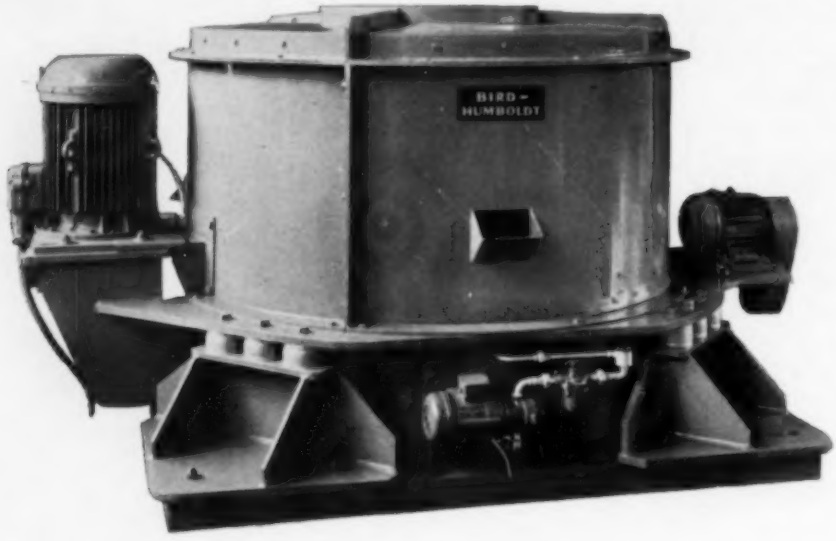
TONNAGES RECORDED AS CLEAN COAL—RAW COAL MINED WAS 5% MORE

Dates	New COLMOL (inexperienced crews)	Older COLMOL (experienced crews)
March		
21	160	855
22	460	700
23	705	940
24	540	780
25	610	790
28	520	750
29	880	890
30	630	875
31	790	860
April		
4	570	960
5	620	540
6	815	795
7	760	780
8	570	700
11	770	890
12	715	1000
13	800	950
14	690	820
15	650	615
16	620	615
18	755	940
19	775	850
20	700	865
21	590	750
22	685	710
25	540	740
26	690	940
27	320	775
28	890	795
29	670	910
May		
2	780	945
3	720	850
4	690	910
5	800	890
6	430	680
9	865	800
10	860	820
11	950	920
TOTALS	**25,585 Tons**	**31,195 Tons**

JEFFREY

MINING • CONVEYING • PROCESSING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

The BIRD-HUMBOLDT
SCREEN TYPE
CENTRIFUGAL COAL DRYER



— a fine coal dewatering unit designed and built on a radically new principle that provides radically improved performance.

The coal moves along the screen surfaces because the basket *oscillates as it rotates.* This two-fold action gives you

SIX ADVANTAGES

1. ***LOW moisture***
2. ***LOW power*** **— the Bird-Humboldt delivers 80 tons of coal per hour with a 30 HP drive**
3. ***LOW maintenance cost*** **— screens last for weeks instead of days**
4. ***LOW filtrate loss*** **throughout the life of the screen**
5. ***LOW operating speed*** **and, therefore, *minimum degradation***
6. ***LOW first cost and low installation cost***

WRITE FOR NEW BULLETIN containing detailed pictures and information on the Bird-Humboldt Dryer

BIRD MACHINE COMPANY
SOUTH WALPOLE • MASSACHUSETTS
REGIONAL OFFICES: EVANSTON, ILLINOIS • PORTLAND, OREGON

Coal Age

JULY • 1955

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Stream Protection

What the problem is in preventing stream pollution, what it means for coal operators, and what the industry can do to avoid future burdens, achieve the desired goal and gain favor with the public is the subject of a recently completed study by Bill Raleigh, of the *Coal Age* staff. See it in the August issue.

Trucks Too

Centralized automatic lubrication has established a new bench mark, this time in the lubrication of big tractor-trailer haulage units for strip mines. Wayne Fuhr, lubrication engineer for the Hanna Coal Co., gives details and benefits in the August issue—and includes some pithy comments on basic lubrication principles.

90 for 2

How is it possible to move up to 90 ft of overburden and mine 22 in of coal at a profit? For the answers, including a description of an outstanding drilling and shooting program, see the report on DeBardeleben stripping at Sipsey, Ala., by Associate Editor Al Flowers, scheduled for August.

Martin Borer

Named for its inventor, Martin Aschacher, mine manager, West Canadian Collieries, Ltd., the Martin Borer is a new lightweight unit for drilling large-diameter holes in pitching coal for ventilation crosscuts and other purposes. Its major difference from earlier units lies in the fact that the big bit is pulled rather than pushed up the pitch by a wire rope threaded through a pilot hole. Design and operating details are given by Mr. Aschacher and Louis Dupret, West Canadian chief engineer, in an article for August publication.

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G. B. Bryant, Jr., Washington

COAL AGE JULY, 1955

VOLUME 60 NUMBER 7

(with which are combined The Colliery Engineer and Mines and Minerals)

Published monthly on the 1st, with an additional issue in Mid-September, by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. Member ABC and ABP.

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 36, N. Y. Publication Office, 1309 Noble St., Philadelphia 23, Pa. Donald C. McGraw, President; Paul Montgomery, Executive Vice President; Joseph A. Gerardi, Vice President and Treasurer; John J. Cooke, secretary; Nelson Bond, Executive Vice President, Publications Division; Ralph B. Smith, Vice President and Editorial Director; Joseph H. Allen, Vice President and Director of Advertising; J. E. Blackburn Jr., Vice President and Circulation Director.

Subscription: Address all correspondence to COAL AGE—Subscription Service, 330 W. 42nd St., New York 36, N. Y.

A McGRAW-HILL PUBLICATION

Member of Associated Business Publications and Audit Bureau of Circulations

Allow 1 month for change of address. Subscriptions are solicited only from management, production and maintenance executives and engineers in the coal-mining industry. Position and company connection must be indicated on subscription orders.

Single Copies: U. S. and possessions and Canada, 50c; all other countries, $1.50.

Subscription rates: United States and possessions and Canada, $3 for one year, $4 for two years, $5 for three years.

Other Western Hemisphere and the Philippines, $10 for one year, $16 for two years, $20 for three years. All other countries, $15 for one year, $25 for two years, $30 for three years.

Entered as second class matter May 4, 1951, at the Post Office, Philadelphia, Pa., under the Act of March 3, 1879. Printed in U.S.A. Contents Copyright 1955 by McGraw-Hill Publishing Co., Inc.—All rights reserved. **COAL AGE** articles are indexed regularly by Engineering Index, Inc. **COAL AGE's** own index is published annually in December.

Branch Offices and District Managers: Atlanta 3, S. T. Henry; Chicago 11, F. W. Roets and G. A. Mark; Cleveland 15, W. M. Spears; Dallas 1, J. H. Cash; Los Angeles 17, G. W. Dysinger; New York 36, T. E. Alcorn; Philadelphia 3, J. B. Lewis (also New York and New England) Pittsburgh 22, H. C. Chellson; St. Louis 1, F. W. Roets; San Francisco 4, J. W. Otterson; Boston 16, Washington 4; McGraw-Hill House, 95 Farringdon St., London E. C. 4.

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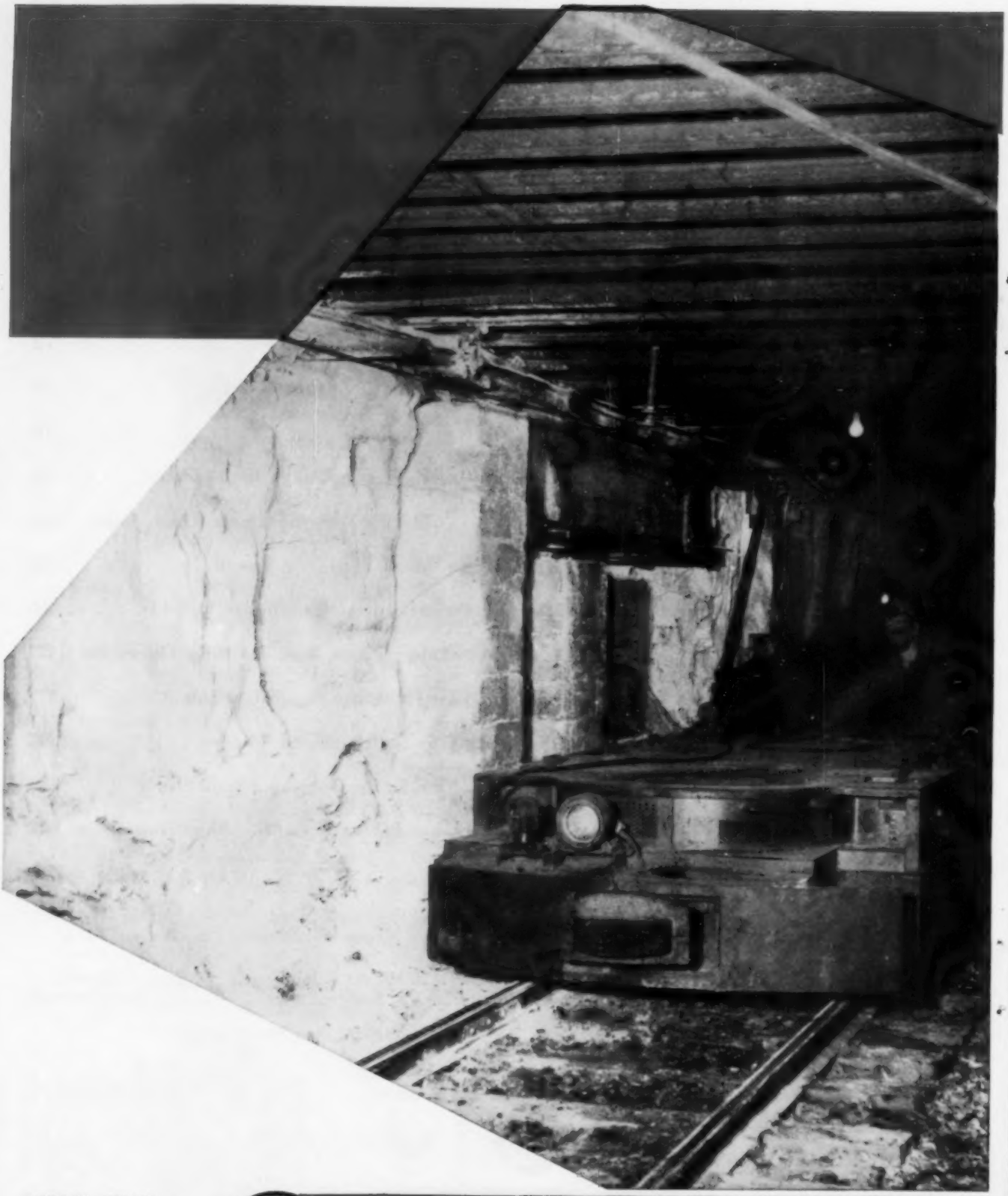
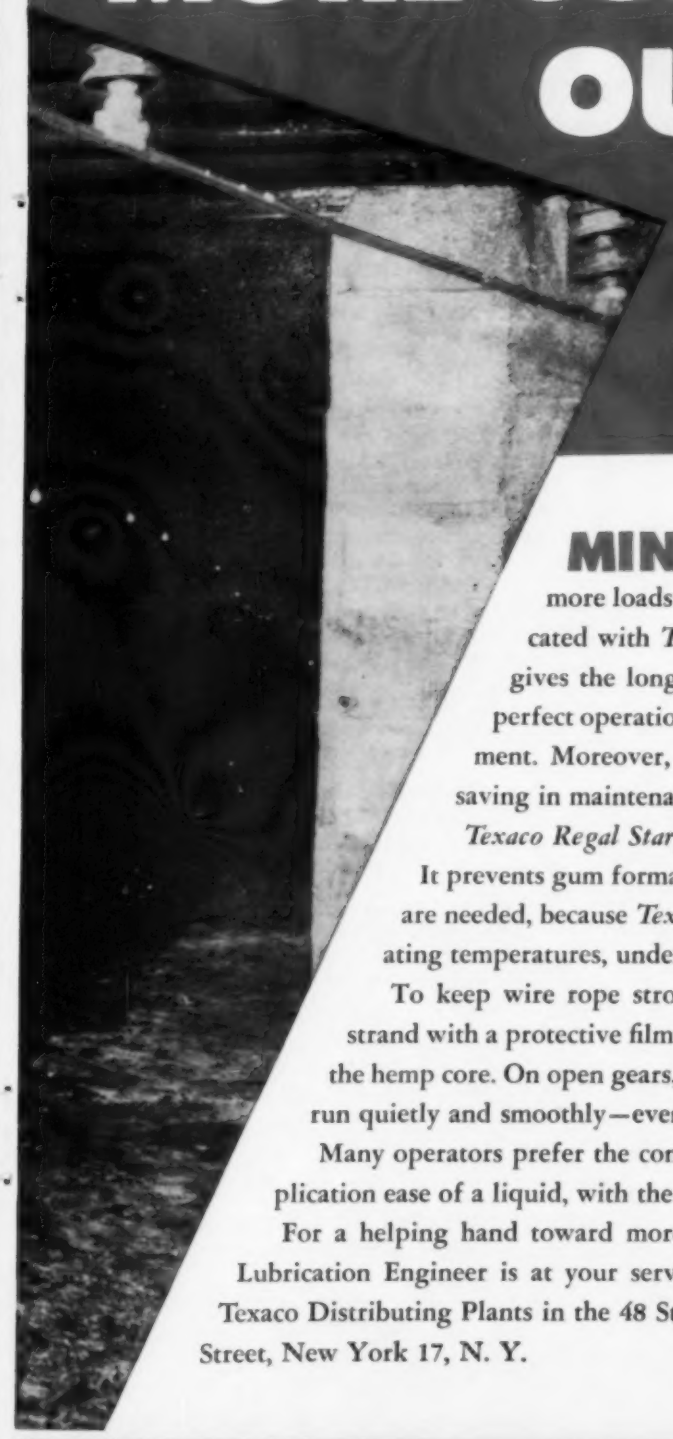


TUNE IN...TEXACO
STAR THEATER
starring
DONALD O'CONNOR
or JIMMY DURANTE
on television...
Saturday nights, NBC.

TEXACO

TEXACO

MORE COAL COMES OUT WHEN TEXACO GOES IN



MINE LOCOMOTIVES can haul more loads at lower cost when anti-friction bearings are lubricated with *Texaco Regal Starfak*. This premium-quality grease gives the longer lasting protection expensive bearings need for perfect operation in locomotives, cutters, loaders and similar equipment. Moreover, you'll get smoother performance . . . plus a big saving in maintenance costs.

Texaco Regal Starfak has exceptionally high resistance to oxidation. It prevents gum formation, does not separate or leak. Fewer applications are needed, because *Texaco Regal Starfak* stays *in* the bearings at all operating temperatures, under every operating condition.

To keep wire rope strong longer, use *Texaco Crater*. It surrounds each strand with a protective film that defies rust and wear, preserves the strength of the hemp core. On open gears, too, *Texaco Crater* does an outstanding job. Gears run quietly and smoothly—even under the heaviest loads.

Many operators prefer the convenience of *Texaco Crater X Fluid*. It has the application ease of a liquid, with the same fine protective qualities as regular *Crater*.

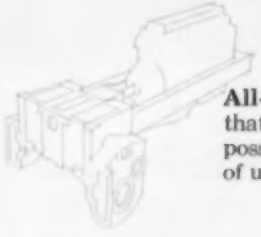
For a helping hand toward more savings through effective lubrication, a Texaco Lubrication Engineer is at your service. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

LUBRICANTS for the Coal Mining Industry

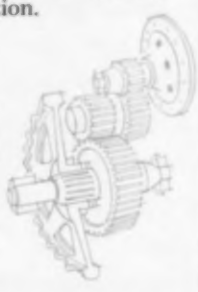
Allis-Chalmers presents the new

ANOTHER BIG STEP AHEAD IN LOW-COST DIRT MOVING

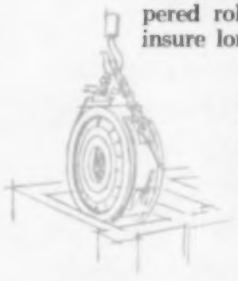
. . . with all the important performance advantages of Allis-Chalmers advanced basic design . . . tested and proved over millions of operating hours!



All-Steel Box-A Main Frame that soaks up shock loads, makes possible the service simplicity of unit construction.

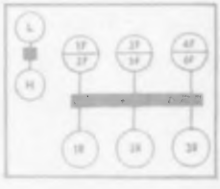


Exclusive One-Piece Steering Clutch and Final Drive Housing with all final drive gears straddle-mounted on tapered roller bearings to insure long life.



Unit Construction lets you remove engine, master clutch, transmission, steering clutches and final drives without disturbing adjacent parts.

1,000-Hour Lubrication Intervals for roller bearing truck wheels, idlers and support rollers . . . makes production time out of service time.



Dual-Range Constant-Mesh Transmission lets you go from any forward speed to any reverse speed by shifting only one lever. Eliminates double shifting! That means faster work cycles . . . more production!

plus . . . these great new features:

New Allis-Chalmers Diesel Engine with "follow-through" combustion and tornado turbulence . . . for smooth engine performance, cleaner combustion, extra long engine life.

New Wrap-Around Radiator Guard used as dozer lift frame to simplify design, reduce cost of bulldozer; guard tilts forward for easy service.

New Master Clutch with Ceramic Lining sets new standards of clutch life . . . with fewer adjustments required.

New Operator Convenience including roomy, flat platform . . . foam rubber seat . . . 24-volt direct electric starting . . . 60-gal. fuel tank.

Tough New Track — New design, through-hardened with extra toughness for long life even in severe abrasive conditions.

PLUS . . . new, all-weather cooling; independent radiator-core mounting; new strength and capacity in final drive gears, shafts and bearings.

NEW STANDARDS OF PERFORMANCE AND LONG LIFE ON A WIDE RANGE OF JOBS

You owe it to yourself to investigate the performance advantages of the HD-11 . . . newest addition to the Allis-Chalmers leadership line. See your nearby Allis-Chalmers dealer now.

HD-11

90 net engine hp

75 drawbar hp

20,500 lb

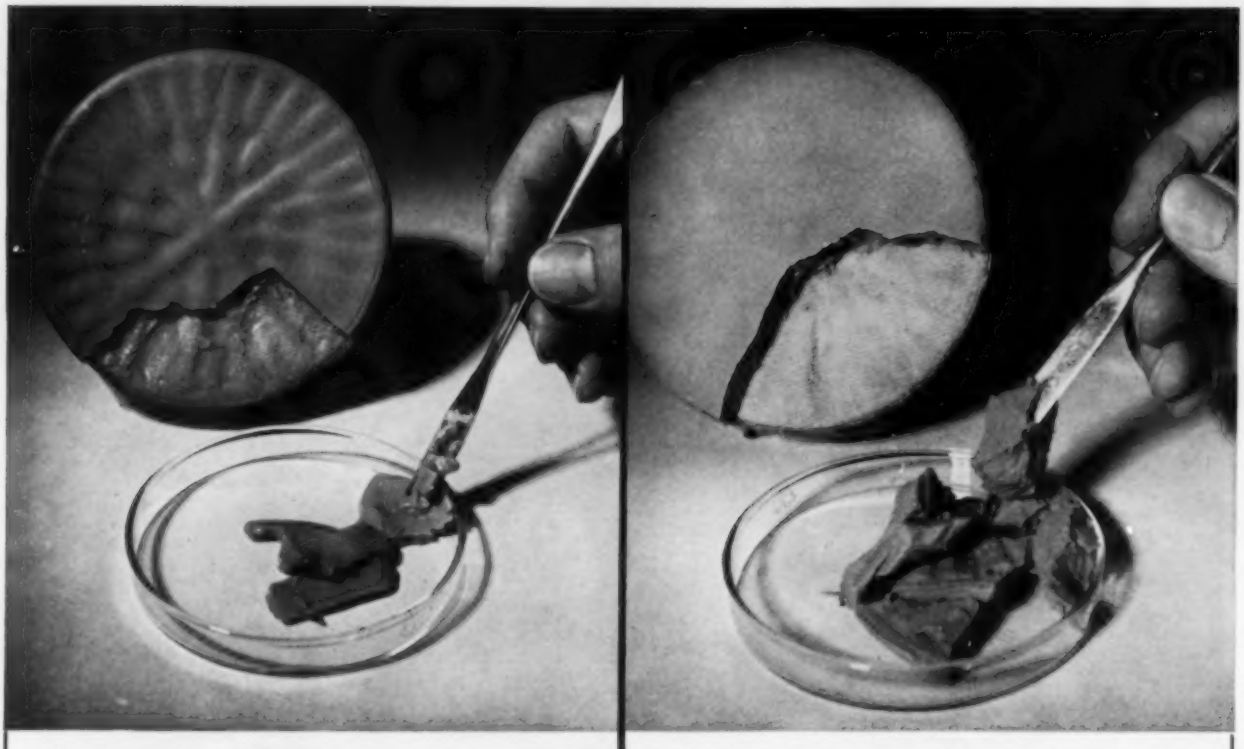
six speeds forward to 5.7 mph
three reverse to 4.4 mph

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Separan 2610

GREATLY IMPROVES FILTRATION



Above picture shows thin cake formed on filter with untreated solids. Cycle includes 15-second cake formation and 45-second drying time.

During the same cycle, a much thicker cake is formed by treating with 0.15 lb. of SEPARAN 2610 per ton of dry solids present.

New flocculating agent speeds up filtration and settling rates, brings many other improvements to liquid-solid separations

THE DOW CHEMICAL COMPANY
Dept. TS 789F, Midland, Michigan

Please send me information and a trial sample of SEPARAN 2610.

Name_____

Company_____

Address_____

City_____ State_____

Prove to yourself the advantages of Separan* 2610 in filtration.

1. Increased cake size
2. Decreased cake moisture and better washability
3. Easy to handle and less dusty cake
4. Less material loss in filtrate
5. Effective over wide pH range

Prove to yourself the advantages of Separan 2610 in settling.

1. Up to 40 times faster settling rate
2. Increased overhead clarity
3. Less materials loss in overhead
4. Reduced cost in acid and alkaline media
5. Increased plant capacity

SEPARAN 2610 is highly effective in these industries:

- Uranium
- Clay
- Borax
- Cement
- Alum
- Potash
- Foundry Sand
- Coal
- Phosphoric Acid
- Iron Ore and Taconite
- Industrial Water, and Waste
- Miscellaneous Metals

*Trademark of The Dow Chemical Company

you can depend on DOW CHEMICALS

DOW

HOW TO OFFSET A 15-TON WALLOP

THE two vibrating hammers on the amazing, new Jeffrey 34-F mining machine deliver a 15-ton wallop 1800 times a minute. That's a terrific amount of vibration and pressure to offset.

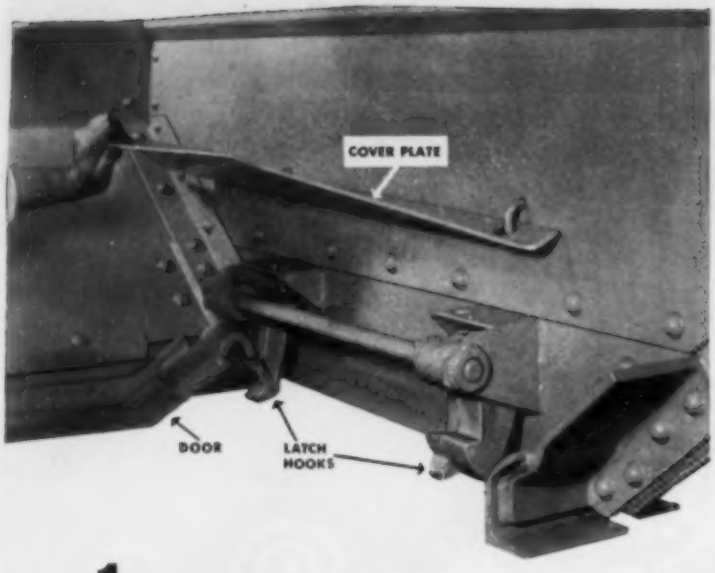
TRABON automatic lubrication systems, even under these severe conditions, provide *positive* measured lubrication to each bearing as needed.

No guesswork! Sealed, safe, sure, simple!

A TRABON system can help keep *your* machinery in continuous motion.

Trabon has been providing trouble-free lubrication for over 25 years.

Trabon ENGINEERING CORPORATION
1814 E. 40th STREET • CLEVELAND 3, OHIO
Oil and Grease Systems



Only S-D Automatics give you these advantages

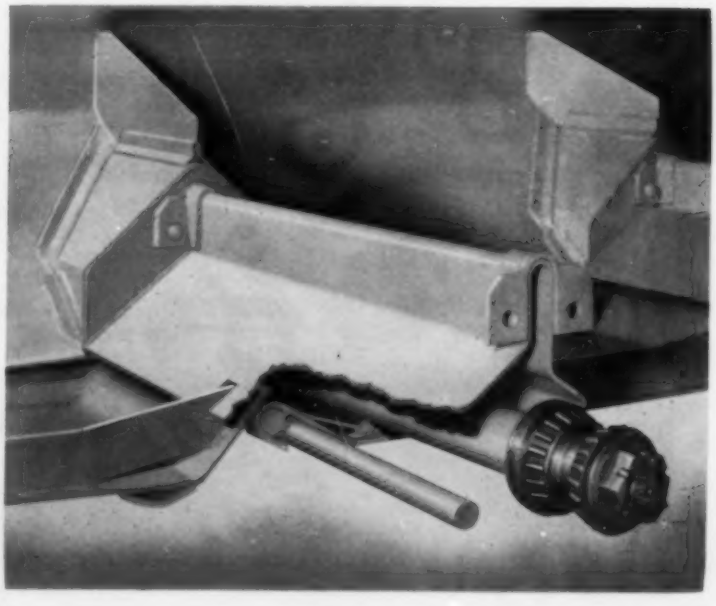
1 TWO LATCHES FOR SAFE AND SURE LATCHING! They are tripped simultaneously underneath car for automatic dumping. With S-D "Twin Safety Latches" your bottom dumping car doors are actually padlocked twice. These latches (see photo above) are tripped independently by a pair of tripping devices mounted between the rails. (Note the tripping devices shown in bin photo on opposite page.) Both latches must be tripped simultaneously before the doors open. This eliminates doors opening accidentally anywhere along the haulage route.

1 "Twin Safety Latches" for safe and sure latching

2 Safety Sealed against dust leakage

3 ¼ to ½ ton more capacity per car for the same overall dimensions

2 SEALED AGAINST DUST LEAKAGE! Sanford-Day's exclusive bottom dumping car seal means two extra values: (1) Sealed S-D Automatics give you a new, safer in-the-mine operation by eliminating leakage of dust. (2) Sealed S-D Automatics enable you to make a tremendous reduction in track clean-up costs. Cross-sectional view at right points out how the flares extend over doors when closed, sealing material in car.



3 ONE-QUARTER TO ½ TON MORE CAPACITY PER CAR FOR THE SAME OVERALL DIMENSIONS is available only in S-D Automatics because of the construction features of Sanford-Day's exclusive bottom dumping car design. If you were buying, for example, 16 bottom dumping cars of any other make with a 4-ton level full capacity, you would need only 14 S-D Automatics of the same overall dimensions to haul the same tonnage. You would save two cars in every 16 . . . 12½ percent in original investment . . . 12½ percent in maintenance . . . 12½ percent less dead weight to haul. Any one of our sales engineers will demonstrate to your complete satisfaction just how we are able to give you this extra capacity.

THESE THREE fundamental and necessary advantages are offered only by S-D Automatics! They mean that only S-D Automatics can haul coal out of your mine at the lowest possible cost! Assure yourself of the maximum economies bottom dumping cars offer you by buying S-D Automatics! For complete information, write or call us today. Sanford-Day Iron Works, Inc., P. O. Box 1511 . . . Telephone 3-4191, Knoxville, Tenn.

Sanford-Day IRON WORKS

KNOXVILLE • TENNESSEE

AND BROWN-FAYRO DIVISION

MINE CARS, All Types - PRECISION WHEELS - "Brownie" HOISTS
CAR RETARDERS - SPOTTERS
PUMPS - OIL SPRAY SYSTEMS

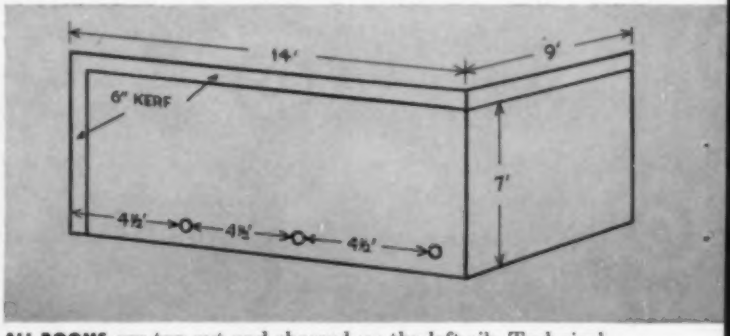
"We get coarse coal, good loadability with 'Monobel' AA—even in a wet mine"

. . . Report M. J. Weber, Vice President, and Arthur B. Ord, Superintendent, Barnes-Dawson Coal Co., Dawmont, W. Va., subsidiary of Bird Coal Co., Philadelphia, Pa.

"Many places in our mine are wet and any mine owner knows that usually spells trouble. But 'Monobel' AA has consistently given us top performance—high percentage of coarse coal, good loadability, smooth rib-shearing action—without regard to wet or dry conditions. This helps us maintain production at a standard level. We can count on 'Monobel' AA for an excellent job at *all* times."

SUPERINTENDENT ORD tests for gas amid a fall of firm, coarse coal. The low velocity heaving action of "Monobel" AA throws the coal within easy reach of mechanical loaders. The small percentage of fines allows quick, efficient cleaning. The good fumes permit a speedy return to the working place.

SAME ROOM cleaned up and made ready for cutting and drilling. "Monobel" AA has sheared the back and rib smoothly. Its high water resistance is a big advantage in this mine.



ALL ROOMS are top-cut and sheared on the left rib. Technical service men from Du Pont helped develop this efficient shooting pattern. Let specially trained Du Pont men assist you with your shooting difficulties.

Whether your problem is a wet mine, excessive fines or thick "middleman"—Du Pont "Monobel" AA provides the solution. If you want flexibility of use in a wide variety of situations, test "Monobel" AA now. Many other mine owners have let "Monobel" AA help them. The result: "Monobel" AA is the largest-selling permissible in the world. For complete information contact the Du Pont explosives representative in your area or write E. I. du Pont de Nemours & Co. (Inc.), Explosives Dept., Wilmington 98, Delaware.

DU PONT
PERMISSIBLES
Blasting Supplies and Accessories

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

Here's where J&L Wire Rope cuts your costs

On the big rigs like this, wire rope is an important cost item. That's why so many big mining men look to J&L for Wire Rope that fits their equipment requirements . . . for the right combination of strength, flexibility and toughness to stay on the job.

They've found the quality of J&L Wire Rope is reflected on the profit sheet in terms of minimum downtime for re-rigging, lower rope costs and more tons mined per wire rope dollar.

J&L Wire Rope quality is the combination of more than 100 years of steelmaking experience, topflight wire rope engineering and the most modern production equipment. The result—every wire, every strand, every J&L Wire Rope is "precisionbilt" for maximum service.

No matter what equipment you're operating there's a J&L Wire Rope designed to give you cost-cutting service life. Write today for complete information on J&L Wire Ropes.

Jones & Laughlin

STEEL CORPORATION — *Pittsburgh*

J&L STEEL

Jones & Laughlin Steel Corporation
411 Gateway Center, Pittsburgh 30, Pa.

Please send me complete information on J&L Wire Ropes.
Please have your representative call.

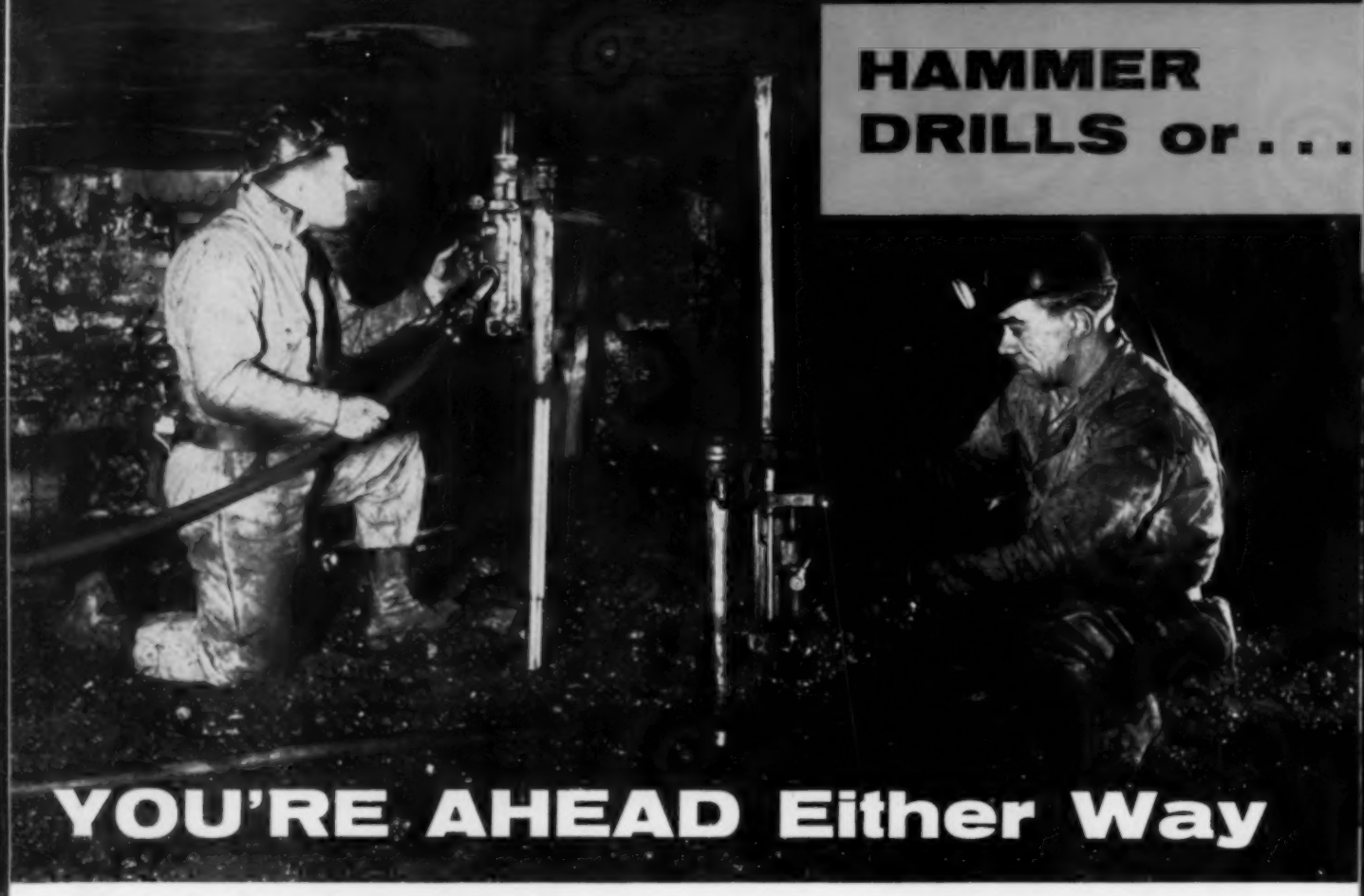
Name_____

Title_____

Company_____

Address_____

What's YOUR roof-bolting method?



HAMMER DRILLS or . . .

YOU'RE AHEAD Either Way

Pneumatic Hammer Drills If you are bolting in hard-structure roof, the Joy SAL-37T Stoper Drill with constant-pressure Telescopic Feed has advantages that no other drill of its type can match. (1) The long steel changes it affords (up to 42") result in *one-third* fewer steel *changes* for your roof-bolters to make; also fewer steel sizes to carry in stock and haul to the face. (2) Air consumption is reduced about 33⅓%, yet (3) at no sacrifice in drilling speed compared to heavier drills using up to 50% more air. (4) Weight is reduced 30%, improving the ease of handling in low or high seams. (5) Maintenance is low; the SAL-37T was developed expressly for heavy duty roof-bolting service—it stays on the job!

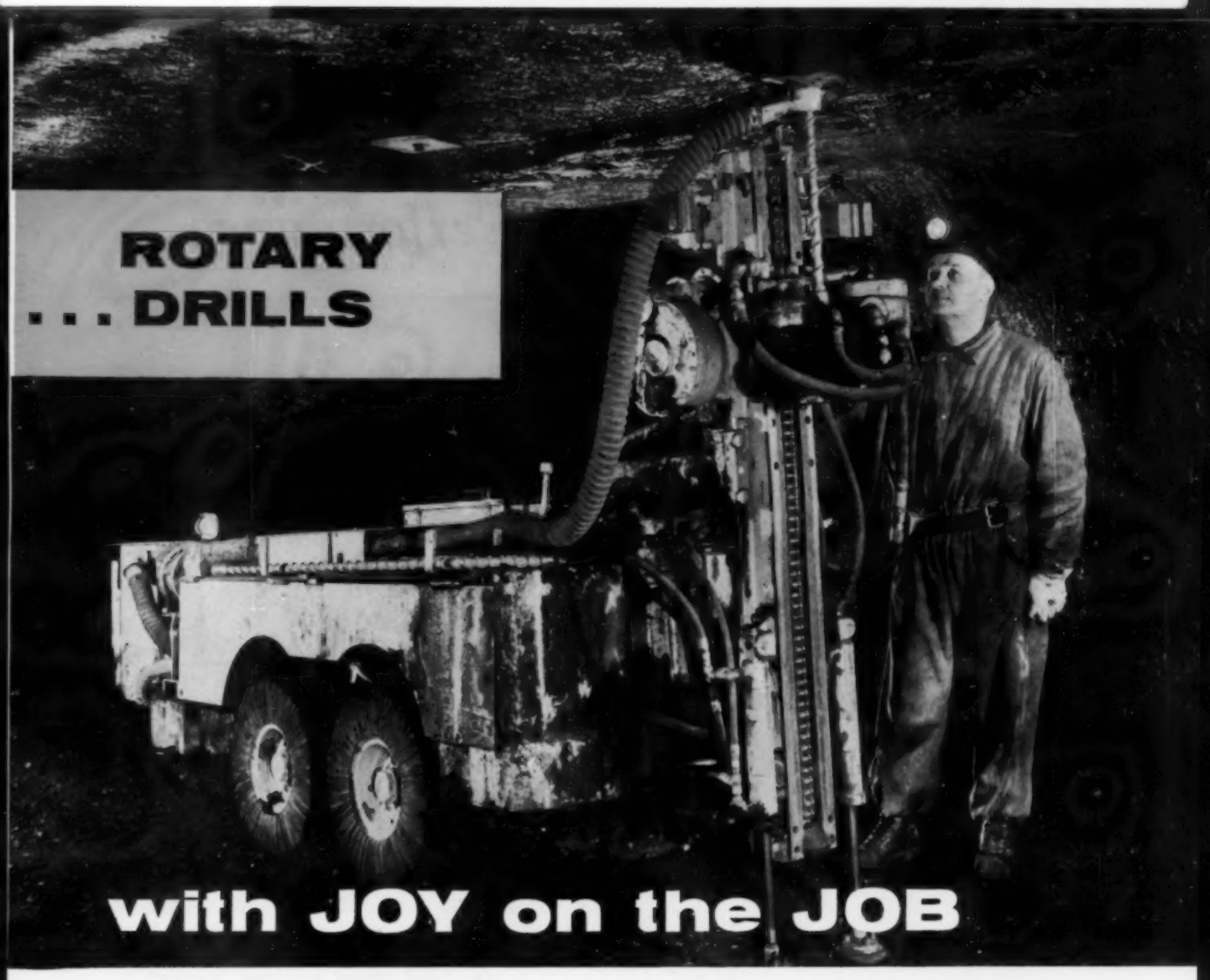
Other superior Joy features include: cadmium-plating inside and out for rust-protection and easier run-in; centralized controls with push-button release for easy operation; and independent feed control (no need to crack the throttle to position the drill). Any way you look at it, the Joy SAL-37T means more hole footage per shift in hard roof, drilled in less time and at less cost. ● *Ask for a demonstration—let us prove it.*

JOY SAL-37T Stoper Drill, length 27½", weighs only 72 lbs., uses only 70 cfm of air.

JOY SERVICE . . .

a Plus Value with Either Drill

Joy sales and service branches and warehouses are conveniently located for immediate availability in every mining area. Joy men are at your side in a matter of hours, when needed, to service your drills—help train your mine personnel to run, maintain and repair the equipment—and help to secure and install Genuine Joy Replacement Parts from nearby stocks, on overnight delivery if necessary. Always use Genuine Joy Parts, made to the original specifications for materials and precision fit.



Hydraulic Rotary Drill For roof-bolting in softer sandstones, shale or slate, where hydraulic rotary drilling can be employed to advantage, you'll find the Joy RBD-15 away out in front.

Chief features of this self-contained, self-propelled, rubber-tired unit are its high maneuverability, great drilling power, and unequalled flexibility in operation. The RBD-15 trams up to 107 fpm, and individually controlled pairs of wheels on each side permit it to turn in its own length, handle as readily in tight places as a crawler-mounted unit, and position holes quickly and accurately.

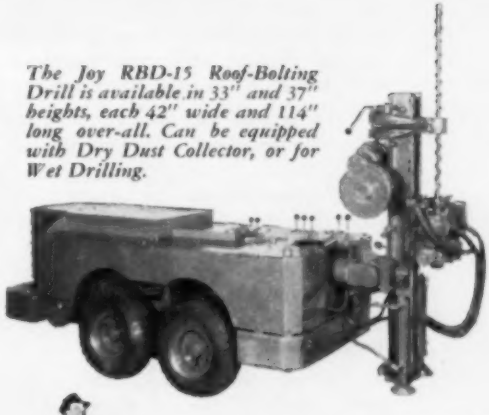
No other rotary drill is as versatile. With just the touch of centralized hydraulic controls (no time lost; nothing to adjust) the RBD-15 offers an infinitely variable combination of thrust, feed speed, rotation speed and torque to suit variations in the roof structure and the changing needs of the job, from drilling the holes to setting the bolts and tightening the nuts.

Feed thrusts can be varied up to 5500 psi; feed speeds up to 12 fpm. Standard feed travel ranges from 22″ to 76″. Drill rotation speed is variable up to 650 rpm and there are two speed ranges: one generally used for drilling, and a lower-speed, high-torque range (up to 240 ft. lbs.) generally used for bolt-tightening.

Hydraulic boom roll and easy manual drill tilt permit drilling at an angle, also compensate for uneven bottom and assure steel changes without moving the machine. Most holes can be bottomed with only one steel change, or less.

Check with us for the roof-bolting equipment, rotary or pneumatic, that will do the best job under *your* conditions. To determine them accurately, a new service—*Joy Rock-Testing Service*—is at your command. Ask about it. **Joy Manufacturing Company, Oliver Building, Pittsburgh 22, Pa.** In Canada: *Joy Manufacturing Company (Canada) Limited, Galt, Ontario.*

The Joy RBD-15 Roof-Bolting Drill is available in 33″ and 37″ heights, each 42″ wide and 114″ long over-all. Can be equipped with Dry Dust Collector, or for Wet Drilling.



Consult a Joy Engineer

JOY

WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

WBD CL5274B

IN OHIO . . . AND THE WORLD OVER

Coal Men Look to Bucyrus-Eries for Real Cost-Cutting Performance

Equipped with special 7½-cu. yd. dipper, this 150-B shovel loads coal from pit near Lexington, Ohio. A 45-cu. yd. Bucyrus-Erie 1050-B shovel is used here, too, for stripping overburden.

With Bucyrus-Erie shovels, like the Model 150-B shown here, experienced mine operators are cutting costs today right where they begin — in the pits. These heavy-duty excavators, because of their advanced design and construction, offer performance that means high output at low cost per yard.

Front-end design is a good example of how Bucyrus-Erie builds better performance into shovels. The unique, two-piece boom is exceptionally strong, rigidly braced to the A-frame with steel members, and has widespread boom feet. It takes digging stresses from all directions. Yet, with all its strength, its weight is light. Crowd machinery is on the revolving frame — not on the boom. Power is applied to swinging profit-making payload, not moving dead weight.

Let experience be your guide when choosing your next loading shovel — the experience of satisfied owners who have found Bucyrus-Erie Ward Leonard electric excavators give them the big output, low cost performance they need. 45L55

BUCYRUS ERIE
South Milwaukee Wisconsin

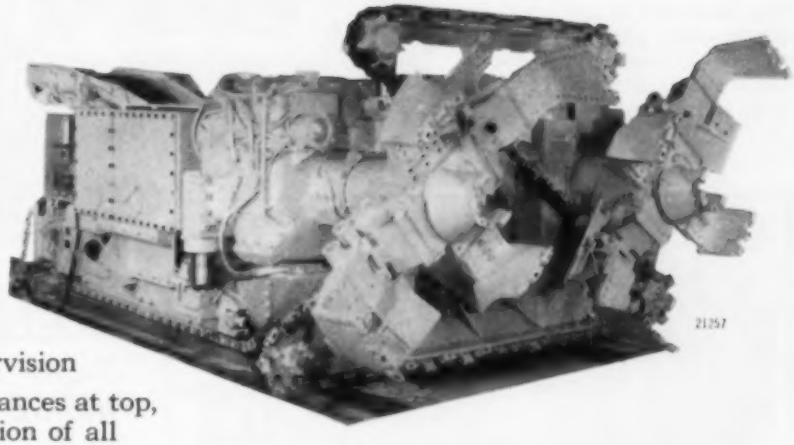
1880 75 1955
YEARS OF SERVICE
to Men Who Shape the Earth

In continuous mining operations

GOODMAN BORING-TYPE MINERS

(Patented and patents pending)

21246



21257

- Cut and load up to 8 tons per minute
- Produce an unmatched percentage of lump coal
- Easily turn crosscuts and follow seam irregularities
- Decrease production costs through concentrated working areas requiring fewer man hours, less supervision
- Provide safe tramming clearances at top, bottom and sides by retraction of all cutting units
- Feature large, rugged parts and a simple, balanced design
- Can be built for seams from 4′4″ min. to 8′ max.

21244

Characteristic cutting pattern of Goodman mine-proved "boring type" miner. Note undisturbed roof and sides, also the wide cleaned-up bottom for roadway.

GOODMAN MANUFACTURING COMPANY

HALSTED STREET AND 48TH PLACE • CHICAGO 9, ILLINOIS

GOODMAN for the most advanced designs in a complete line of machinery for continuous and conventional mining

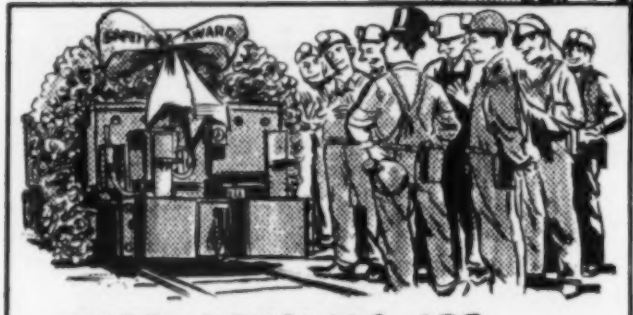
FACTS ABOUT Exide®

IRONCLAD® MINING BATTERIES

LOW-SEAM MINES GET LOWEST-COST HAULAGE ...WITH EXIDES

HAULAGE IS SPEEDED FROM FACE TO DISCHARGE POINT, PRODUCTION IS BOOSTED THROUGHOUT THE MINE WITH EXIDE-POWERED SHUTTLE CARS. DEPENDABLE EXIDE-IRONCLADS GIVE YOU MORE TRIPS PER SHIFT, MORE PRODUCTION PER MAN-HOUR, LOWEST HAULAGE COST PER TON! THEIR AMPLE POWER KEEPS EQUIPMENT WORKING FULL-SHIFT, WITH NO LET-DOWN IN PERFORMANCE. WITH LOWEST COSTS TO OPERATE, OWN AND MAINTAIN, EXIDE-IRONCLADS ARE ALWAYS YOUR BEST MOTIVE POWER BUY—

AT ANY PRICE!



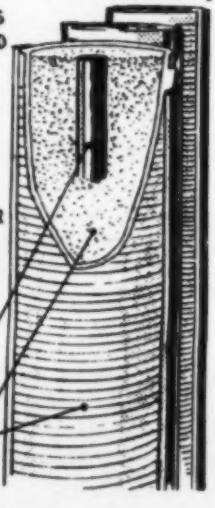
EXIDE-IRONCLADS ARE THREE WAYS SAFER!

MINE LOCOMOTIVES, SHUTTLE CARS AND TRAMMERS POWERED WITH EXIDES KEEP SAFETY-FIRST ENGINEERS SATISFIED BECAUSE: THERE'S NO NEED FOR OVERHEAD WIRES AND TRAILING CABLES—THE HAZARD OF STRAY CURRENTS IS ELIMINATED— POWER IS BOTH INDEPENDENT AND AVAILABLE, IN THE EVENT OF INTERRUPTION OF NORMAL POWER SUPPLY OR ACCIDENT.

TUBES OF POWER WORK FOR YOU INSIDE AN IRONCLAD

SLOTTED TUBES INSIDE AN IRONCLAD KEEP ACTIVE MATERIAL IN FIRM CONTACT WITH CONDUCTING GRIDS OF THE POSITIVE PLATE... THIS GRID PROTECTION LENGTHENS THE LIFE OF THE BATTERY. SLOTTED TUBES EXPOSE MORE ACTIVE MATERIAL TO THE ELECTROLYTE... FOR GREATER POWER. FINE TUBE SLOTS HOLD MATERIAL IN CONTACT WITH GRID LONGER. RESULT: THE IRONCLAD'S ABILITY TO DO YOUR MINE HAULAGE JOB FOR A LONGER PERIOD OF TIME. THAT'S WHY EXIDE-IRONCLADS ARE YOUR BEST MINING BATTERY BUY—

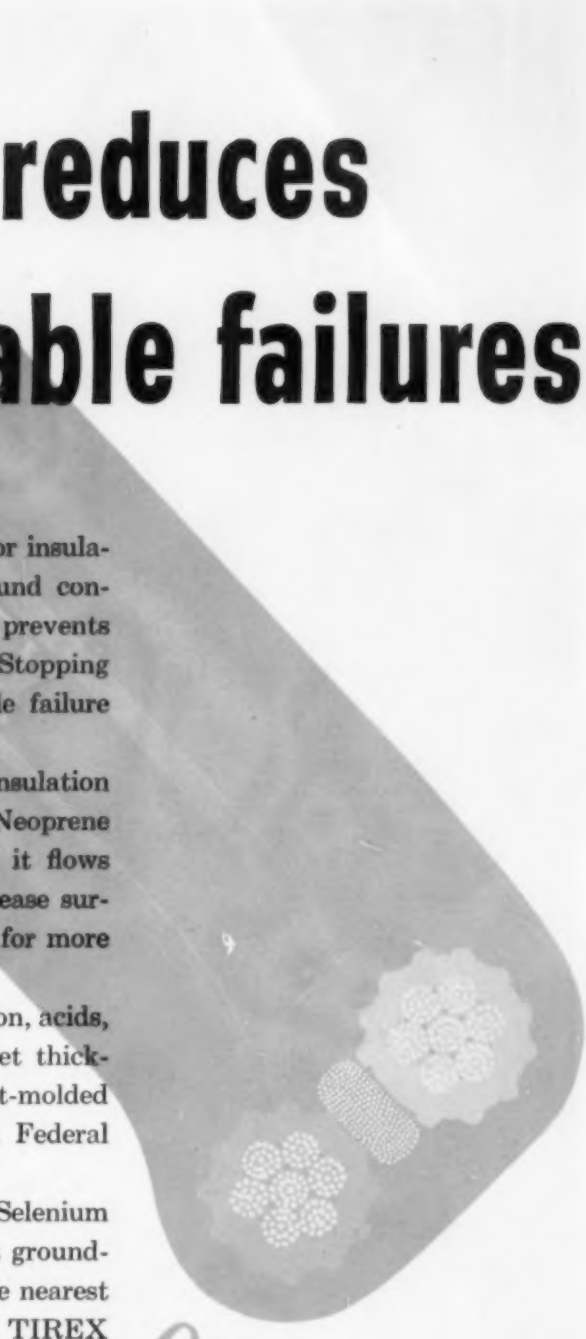
AT ANY PRICE!



LET EXIDE HELP SOLVE YOUR MINING BATTERY PROBLEMS. ❶ CALL AN EXIDE SALES ENGINEER FOR FULL DETAILS. ❷ WRITE FOR FORM 1982, A MANUAL ON MAINTAINING MOTIVE POWER BATTERIES.

Exide INDUSTRIAL DIVISION, The Electric Storage Battery Company, Philadelphia 2, Pa.

How TIREX reduces shuttle car cable failures



Semicircular ridges, integral parts of the conductor insulation, grip the jacket tighter than conventional round conductors ever could. This greater gripping ability prevents insulated conductors from moving inside the jacket. Stopping conductor movement within the sheath stops cable failure from conductors twisting, bending and pulling.

An open braid applied over the ridges locks the insulation and jacket together. It works this way: As Selenium Neoprene Armor is extruded over the insulated conductors, it flows around the braid between the ribs. The ridges increase surface area of the insulation, thus making more area for more adhesion.

TIREX's Selenium Neoprene Armor resists abrasion, acids, chemicals, corrosion, flame, moisture and oils. Jacket thickness conforms to Bureau of Mines tolerances. Jacket-molded Approval No. P-101 BM assures compliance with Federal and Pennsylvania Safety Codes.

TIREX Shuttle Car Cable with its cured-in-lead Selenium Neoprene Armor is available either with or without grounding wires. Write to the address below, or contact the nearest Simplex representative, to learn more about how TIREX can help you reduce shuttle car cable failure.

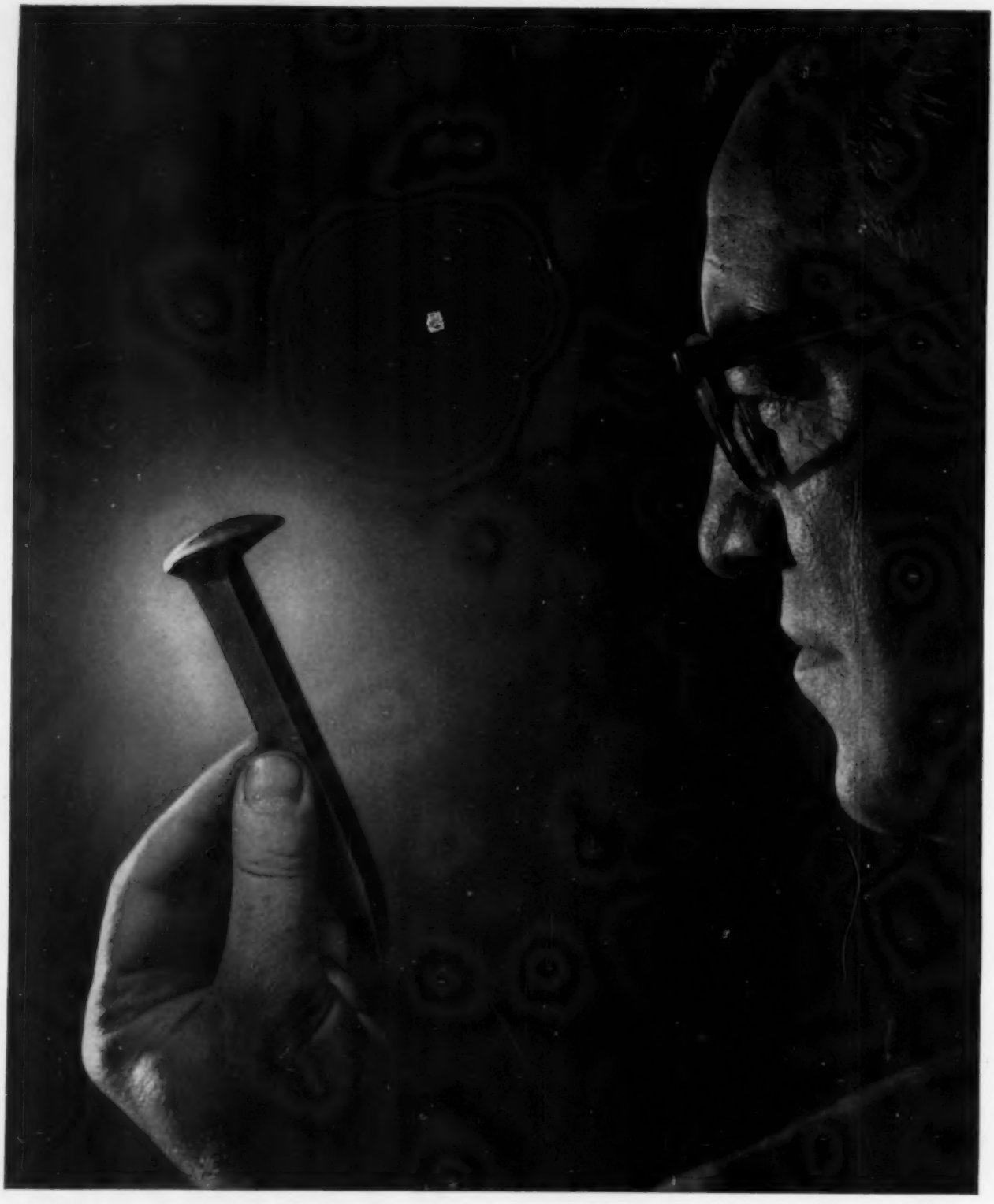
Simplex

TIREX

SIMPLEX WIRE & CABLE COMPANY

79 Sidney Street, Cambridge 39, Massachusetts

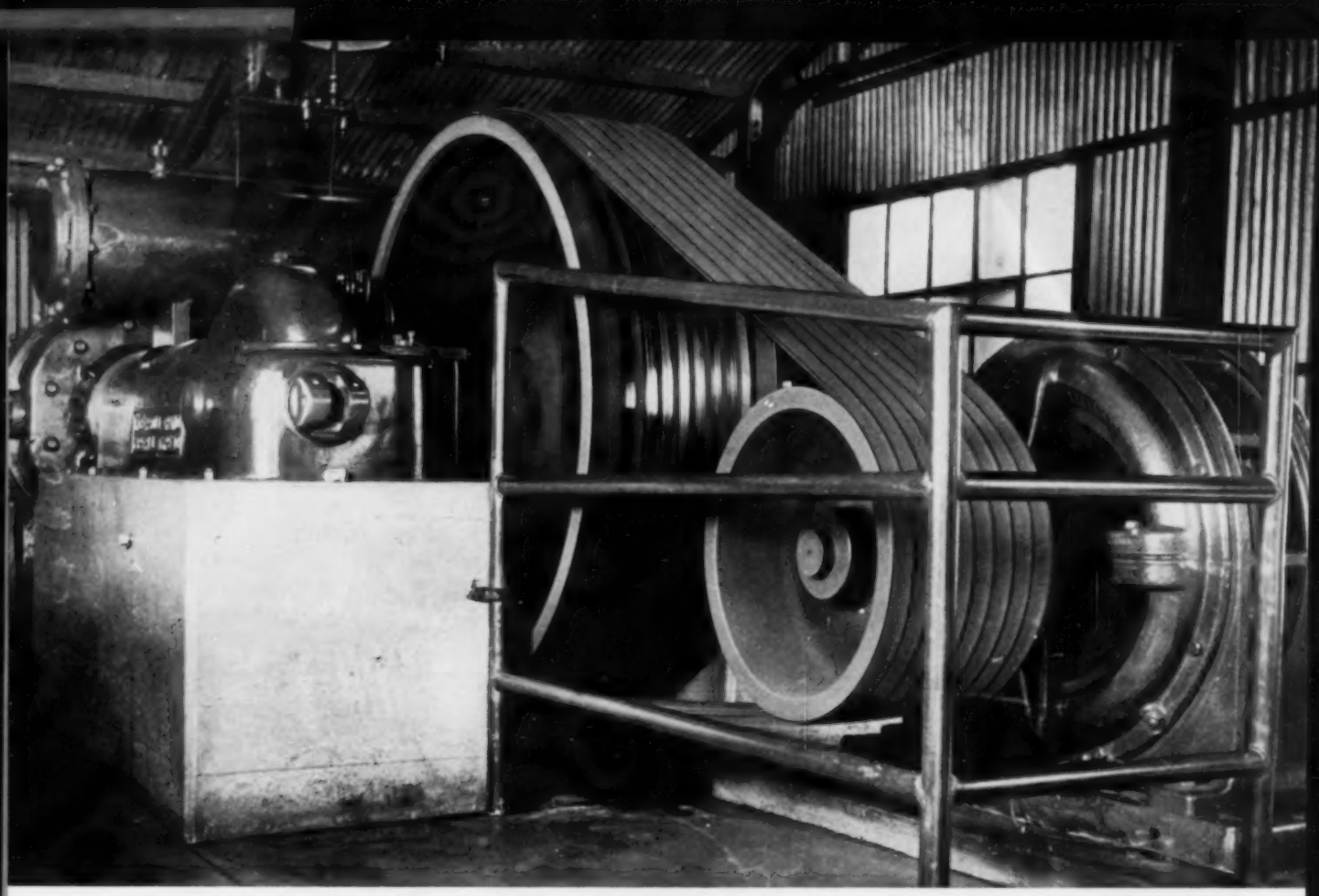
Pioneers in Research on Wires and Cables Since 1889



"We've always had good results with Bethlehem Spikes.
They take a clean bite, and drive fast."

We make machine and track bolts, too!

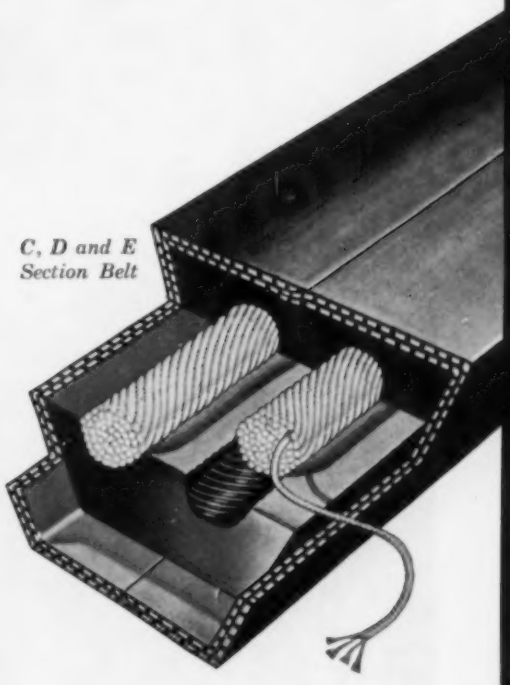
BETHLEHEM STEEL



Thermoid Multi-V Belts cut operating costs

There's a Thermoid V-Belt for every mining application. Every belt is *pre-stretched* to provide longer service and maximum power transmission without slippage. Thermoid C, D and E sections are rayon-grommeted for brute strength and extra flexibility that withstands repeated shock loads. The entire belt is vulcanized into a solid unit that resists moisture, abrasion, internal friction and heat.

Get longer wear with less maintenance . . . cut your operating costs with Thermoid Multi-V Belts. To meet the exacting requirements of mining service, your Thermoid Distributor carries a complete line of Thermoid Multi-V Belts, Hose and Conveyor Belting. Call him or write direct for complete information.



C, D and E Section Belt

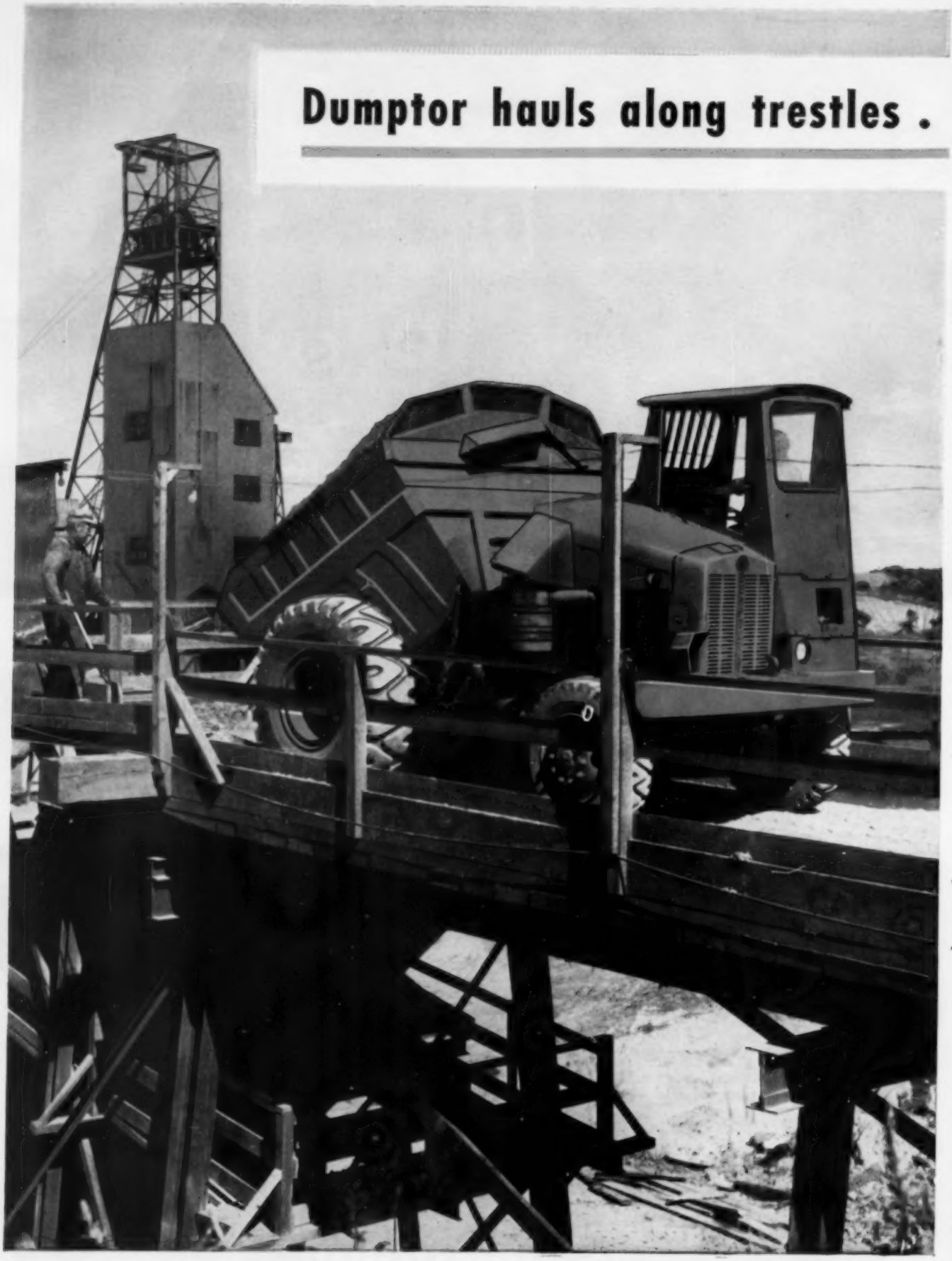
Thermoid

Conveyor & Elevator Belting • Transmission Belting
F.H.P. & Multiple V-Belts • Wrapped & Molded Hose

Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Thermoid Company • Offices & Factories: Trenton, N. J., Nephi, Utah

Dumptor hauls along trestles .



. . or tunnels

without turning

Shuttling back and forth between the loading unit and dump area, Koehring Dumptor travels round-trip without turning. It operates with equal ease in both directions on overhead trestles, in confined underground mines, on open-pit ledges and narrow haul roads. Dumptor gets this unique no-turn advantage through a constant-mesh transmission that gives the same 3-speed travel in either direction.

Every turn eliminated cuts 15 seconds off cycle time. This adds up to a substantial increase in yards hauled per hour. For example, by saving only 2 turns, time studies prove that Dumptor increases hourly yardage output more than 10% on an average 1,000-foot haul.

One-second gravity-dumping also maintains a high rate of production. To dump, operator trips body-release lever, and the 6-yard body instantly tilts 70°. One second later the load is out, and Dumptor is on its way back for the next load. There's no 15 to 25-second wait for slow-acting hydraulic or electric body hoists. What's more, gravity-dump never balks, never wears out.

To learn what these Dumptor advantages can mean in increased production and lower hauling costs on your work, call your Koehring distributor, or write for Dumptor® catalog.

KOEHRING COMPANY

Milwaukee 16, Wisconsin

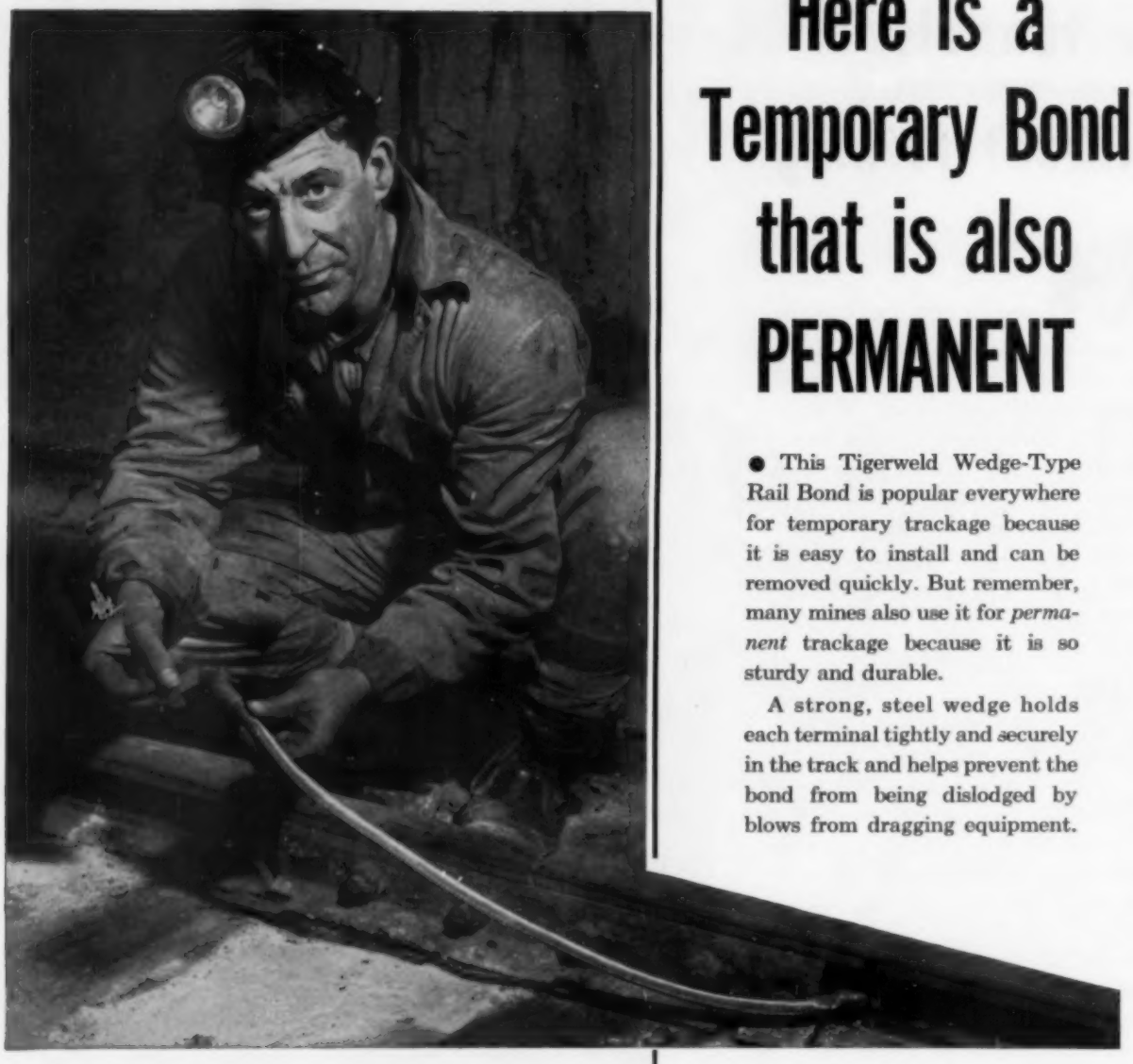
Subsidiaries: PARSONS • KWIK-MIX • JOHNSON

K440

On trackless mining operation, Koehring 6-yard Dumptor goes underground . . . shuttles in and out of access tunnel without turning. This heavy-duty hauler has over 6 h.p. per ton of loaded weight, climbs 24% ramps, grades.

Dumptor puts stockpiling on a fast, shuttle-haul basis. It drives up to edge of pile, body forward . . . dumps, and heads back for next load without turning. Instant gravity-dump action kicks the load out over edge of the bank . . . saves a lot of dozer clean-up on the stockpile.

Big square body opening permits loading over either end or sides. Dumptor above is teamed with Koehring 1½-yard 605 shovel . . . a big-production combination. Other Koehring excavators: ½ to 2½ yards . . . cranes up to 79½ tons.



Here is a Temporary Bond that is also PERMANENT

● This Tigerweld Wedge-Type Rail Bond is popular everywhere for temporary trackage because it is easy to install and can be removed quickly. But remember, many mines also use it for *permanent* trackage because it is so sturdy and durable.

A strong, steel wedge holds each terminal tightly and securely in the track and helps prevent the bond from being dislodged by blows from dragging equipment.

Installation is a SNAP!

Simply drill a hole in the track. Insert the terminal, then the wedge. Pound in the wedge. Three sharp blows with a 2½ lb. hammer and you're done! You've got a durable, low-resistance bond that is easy to remove if the track must be relocated . . . one that is sure to give dependable, lasting service if the track is permanent.

Write for complete information

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO
PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL & IRON DIVISION, FAIRFIELD, ALA.
SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

USS Tigerweld Rail Bonds

UNITED STATES STEEL

STANOLITH MP Grease—a single grease—lubricates all equipment at Wright Mine

THE BOONVILLE COLLIERIES Corporation's Wright Mine uses STANOLITH MP Grease to lubricate all grease-lubricated bearings. To Wright Mine management this is good business. Using a single but multi-purpose grease, the management finds, cuts grease inventories, reduces grease dispensing equipment and, in application, eliminates costly dispensing mistakes.

Roller, ball, plain, and needle bearings are lubricated by this one grease. This applies to all mine equipment—Marion stripper, loading shovel and dragline; 7 Euclid 45-ton coal haulers; two Caterpillar D8 Bulldozers and two International Harvester tractors.

Using STANOLITH MP Grease saves Wright Mine money. It can save you money, too. Find out. In the Midwest, call your nearby Standard Oil lubrication specialist. Or contact Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

Marlin Carter, Wright Mine pit foreman (right), and Oscar Daussman, Standard Oil lubrication specialist, discuss equipment lubrication. Oscar is an old hand at providing technical service on lubrication problems. He has had more than 30 years' experience with Standard Oil, much of it working with customers on such lubrication jobs as this one at Wright Mine. Customers find this experience pays off *for them.*

STANDARD

STANDARD OIL COMPANY
(Indiana)

Bank on a *Task-Force* Truck to Cut Your Hauling Costs!

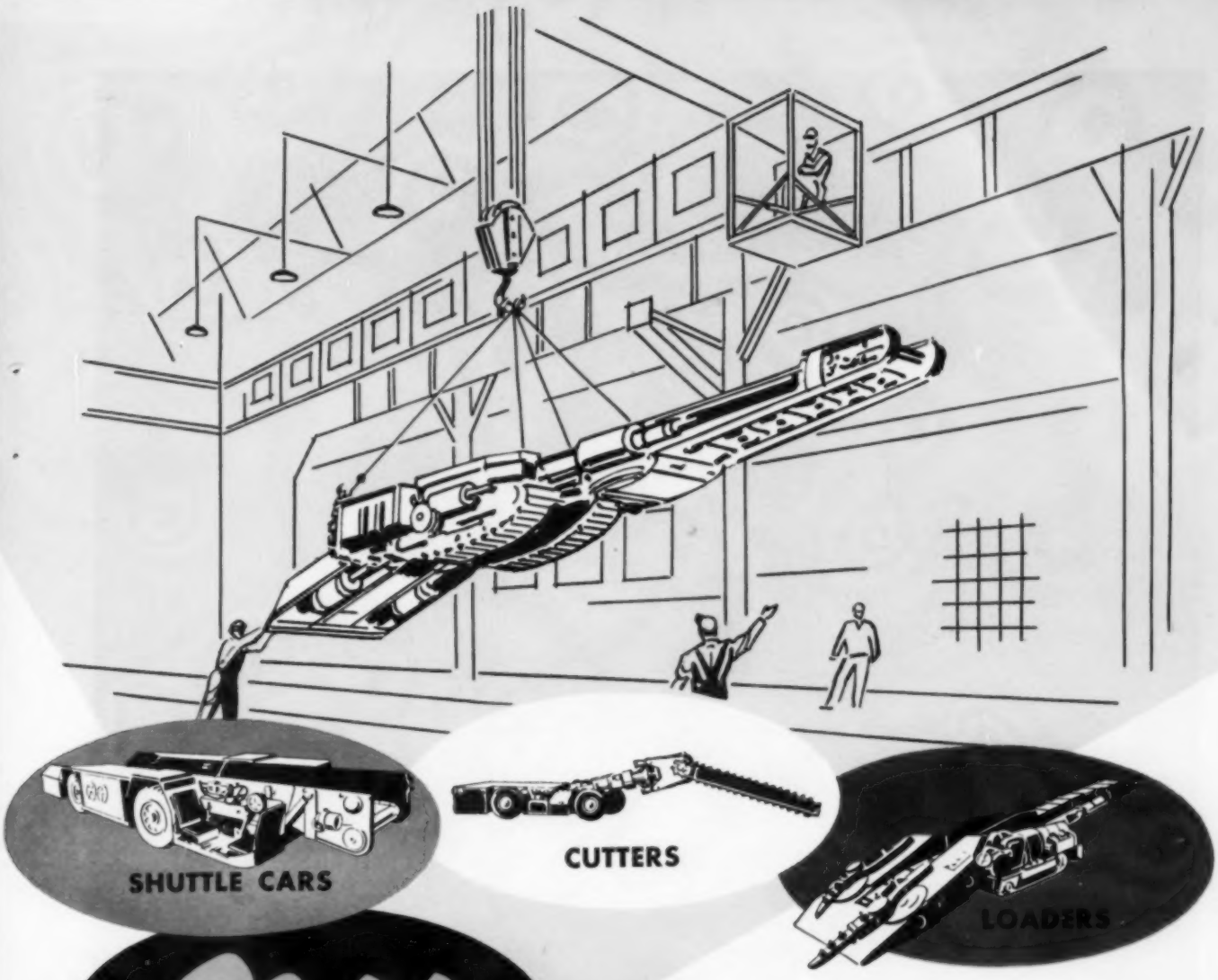
You'll save money on the job and be way ahead at trade-in time with a modern Chevrolet heavy-duty hauler!

You save with modern high-compression power—Specify a new Loadmaster engine . . . or the big 140-h.p. Jobmaster (optional at extra cost). With either of these highly efficient valve-in-head engines you get the most out of a gallon of gas. You accelerate fast, level the hills that could cut valuable time from your schedules. And even in cold weather you start more quickly with Chevrolet's hefty 12-volt electrical system. That's a big advantage in itself—a husky reserve of electrical power when you need it!

You save with the most modern truck features your industry has ever seen—New standard-width frames—more rigid with completely parallel side members. Power Brakes are standard on 2-ton jobs; other power helpers are available. Panoramic windshield, High-Level ventilation, softer seats, new concealed Safety Step—they're features that make Task-Force trucks extra easy to live with. Driving's less of a chore. You're bound to save money when you can maintain peak efficiency!

Why buy an old-fashioned truck and stand to take a licking at trade-in time? See your Chevrolet dealer for the most modern truck money can buy. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

NEW CHEVROLET CHEVROLET *Task-Force* TRUCKS



COAL MINING EQUIPMENT

Repaired-Reconditioned-Rebuilt Like NEW

National Mine Service Company is the largest, most complete and only plant authorized by JOY in the service field for repairing, reconditioning and rebuilding complete machines or subassemblies such as wheel units, control panels, speed reducers, pumps, valves, booms, and other units.

National Mine's facilities—at the Ashland, Kentucky Plant—are centrally located for fast service to all major coal-producing fields. This plant . . . with experienced personnel—modern maintenance equipment—large stocks of genuine Joy replacement parts . . . offers you complete repair or renewal service *plus a definite schedule of delivery!*

National Mine Service Company

564 ALCOA BUILDING, PITTSBURGH 19, PA.

See your National Mine Representative for details!

7 Plants to Serve You

ALL-STATE DIVISION
Logan, W. Va.

ANTHRACITE DIVISION
Forty Fort, Pa.

BEMECO DIVISION
Beckley, W. Va.

KY.-VA. DIVISION
Jenkins, Ky.

ASHLAND DIVISION
Ashland, Ky.

WESTERN KY. DIVISION
Madisonville, Ky.

WHITEMAN DIVISION, Indiana, Pa.

Wire Rope at Work—Here's a busy Purple Strand haulage rope in the beautifully kept hoist house of an Eastern coal mine. It pulls loaded cars up a 9400-ft slope that has an average grade of 5.5 pct and a maximum grade of 8.7 pct. The design of the installation is based on raising four trips of 45 loaded cars per hour. Stated another way, this means 540 tons of run-o'-mine material per hour.

The rope is a big one—6x21 U, 1¼-in. diam. Wound in four layers on a 12-ft drum, it operates at approximately 1700 ft per min when hauling coal or supplies. Its strength has proved far in excess of actual needs, and its husky wires have shown remarkable resistance to abrasion. Like all Bethlehem mining ropes, it seems to be destined for a long and useful life . . . in a service tougher than most.

Bethlehem Steel Company, Bethlehem, Pa. On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. Export Distributor: Bethlehem Steel Export Corporation

Mill depots and distributors from coast to coast stock Bethlehem rope for the following industries and numerous others:
MINING • QUARRYING • CONSTRUCTION • PETROLEUM • EXCAVATING • LOGGING • MANUFACTURING

INTERNATIONAL TD-24 CRAWLER strips 6 to 12 feet of overburden to reach the vein. Next step is loosening rock of vein with giant hydraulic ripper mounted on 161 hp. TD-24.

"They Take a Beating But They're Always Back for More"

"INTERNATIONAL Crawlers Out-Perform, Outlast Other Crawlers in Our Pit," says Texas Iron Ore Miner

Any iron ore mining work is rough on a crawler tractor, but for pure punishment few can match the L. B. Haberle operation in Jacksonville, Texas.

On a 55-acre site on the outskirts of this east Texas town, Haberle is stripping 6 to 12 feet of highly abrasive overburden to reach an 18-inch vein of iron ore used by nearby ready-mix cement plants.

When Haberle's INTERNATIONAL TD-24 completes stripping work, it pulls an hydraulic ripper along the length of the vein. After rock has been loosened, it is loaded out by his INTERNATIONAL DROTT TD-9 Rock Fork bucket.

Haberle has standardized on INTERNATIONAL crawlers for all the heavy work. As he says, *"My* INTERNATIONAL *crawlers get the work done faster, with less cost.*

"Since I've had INTERNATIONAL *on the job, the production has had a substantial increase with no downtime on these crawlers. The sand used to chew up tracks and rollers on another tractor we had in a matter of weeks. But the* INTERNATIONAL *crawlers keep right on going without any signs of wear.*

"Lots of power and speed, too. I've had all makes of crawlers on my work but it's INTERNATIONAL *from now on."*

Whatever the job, big or small, a complete line of INTERNATIONAL machines with matched equipment lets you select the single machine or entire spread exactly suited to your requirements. Here's the lineup:

Eight rugged crawlers from 33 to 200 horsepower
Twenty-six hydraulic and cable-controlled bulldozers and *Bullgraders*
Four tractor-drawn scrapers from 10 to 27 cu. yds. heaped capacity
Two high-speed earthmovers
Four INTERNATIONAL DROTT Skid-Shovels from ⅞ to 3½ cu. yds.

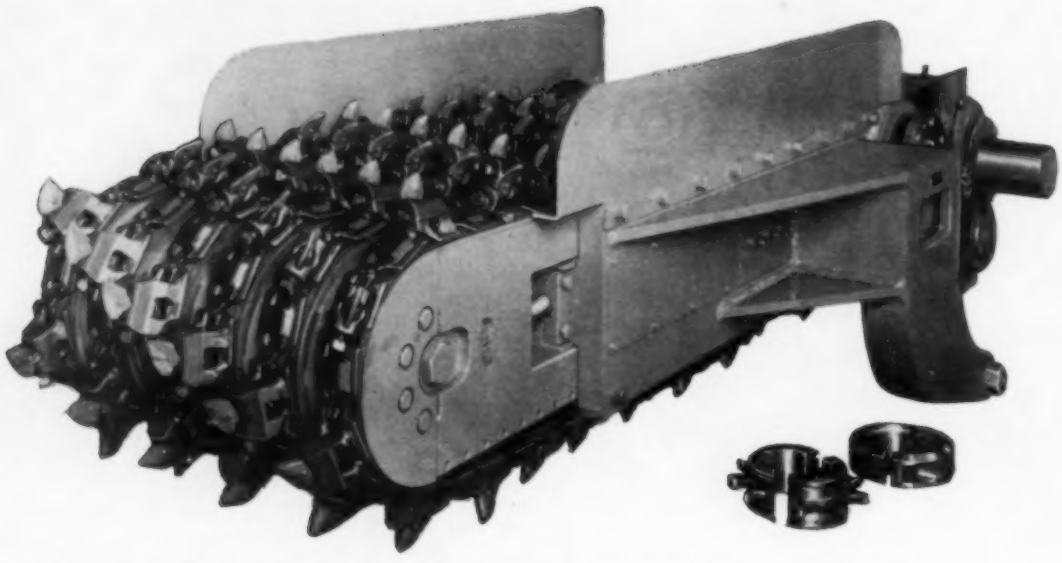
Your INTERNATIONAL Industrial Power Distributor will show you how any of these machines can help increase production on your job. Call him today.

INTERNATIONAL HARVESTER COMPANY, CHICAGO 1, ILLINOIS

ORE IS LOADED out by Haberle's INTERNATIONAL DROTT TD-9 Rock Fork bucket. TD-9 picks up ore, shakes out sand, dumps ore into luggers where it is broken up before it is hauled to the crusher.

INTERNATIONAL HARVESTER

INTERNATIONAL®
INDUSTRIAL POWER
MAKES EVERY LOAD A PAYLOAD



presenting another advance in modern mining . . .

6-IN-ROW RIPPER HEAD

. . . incorporating Bowdil Carbide Bits.

POINTS OF ADVANTAGE:

1. The Bowdil Fabri-Forged Chains, with their great strength and flexibility. The strongest chain for its size in the field.

2. The Bowdil Ripper Head utilizes 6 renewable, independently adjusted Cutterbars, making it possible to retain equal tension on all 6 chains regardless of their length or age, within liberal limits.

3. Special hard-surfaced wearing shoes in heads of Cutterbars eliminating maintenance on roller and bearings as formerly used.

4. All 6 chains are similar in kerf and lacing arrangement for interchangeability.

5. The chains may be run with or without renewable liners in the Cutterbars as desired.

6. Included in the Ripper Head assembly is a special improved design head drive shaft and sprocket assembly, which makes it possible to renew a sprocket in minutes without removing the shaft—(two-piece sprockets are used, held on the double keyed shaft by means of special designed resilient clamping collars, maintaining extreme tension to the shaft.)

7. All 6 sprockets are interchangeable.

8. The rear of the Ripper Head frame is arranged with circular shock seats for the drive assembly which normally clears the drive assembly approximately 1/16" to guard against extreme flexing of the drive shaft at overloads. This avoids breaking the shaft.

9. The Ripper Head is complete—nothing else needed from the gear boxes out.

Manufactured by

The **BOWDIL** Company
CANTON 7, OHIO

SMALLEST OUTSIDE

BIGGEST INSIDE CAPACITY

Now you can guarantee delivery to your customers of ¼″ x 28M fine coal with as little as 5% surface moisture.

The McNally Dryclone fits anywhere in the plant in a space of 72″ x 72″. But its whirlwind action actually dries fine coal up to 50 tons per hour!

The Dryclone's low first cost—Low maintenance—Low operating costs give you more profit. Send postcard for complete information.

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BUSINESS REPLY CARD
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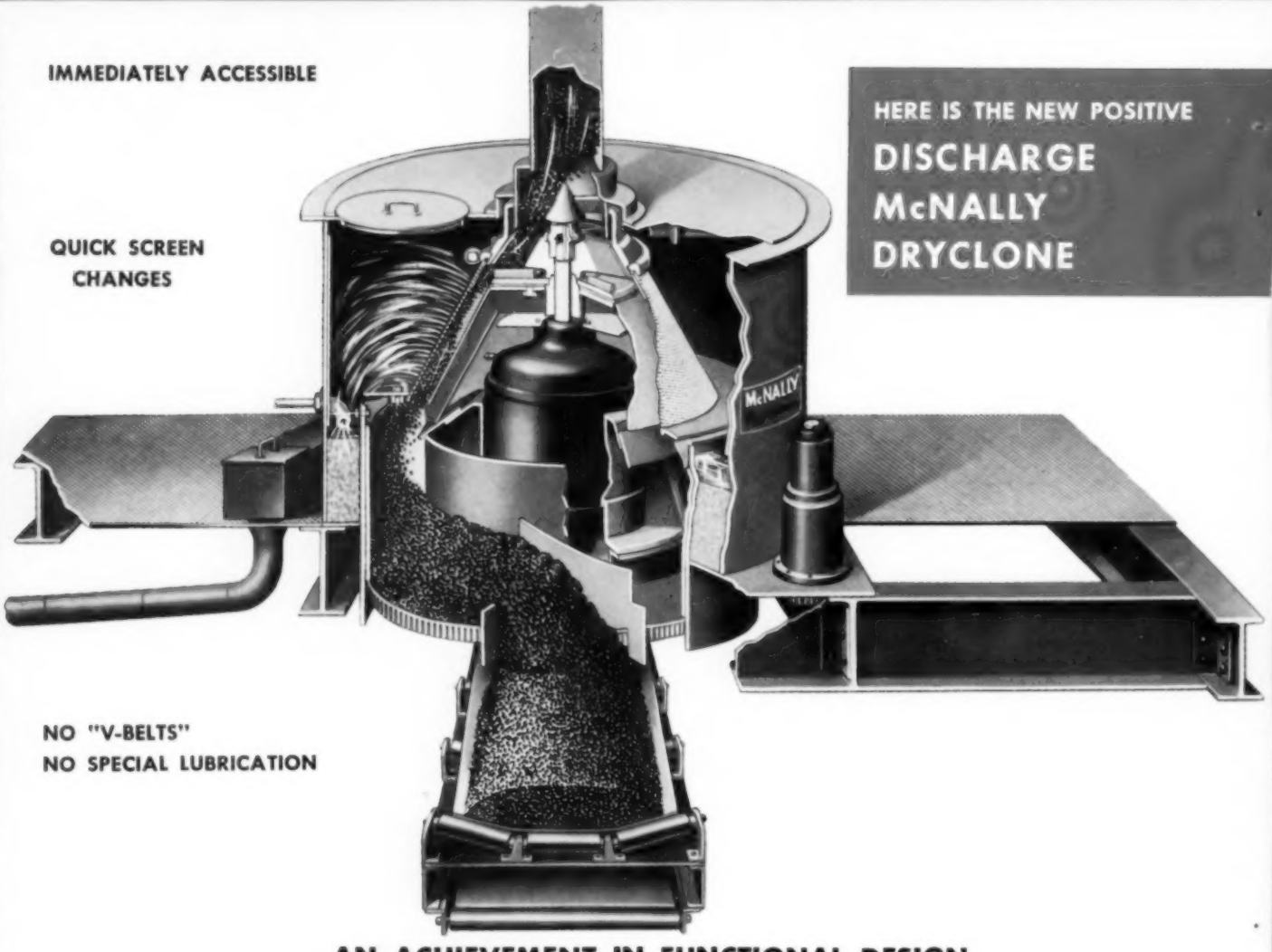
PITTSBURG, KANSAS

LOW INITIAL COST
EFFICIENT OPERATION
LOW MAINTENANCE

IMMEDIATELY ACCESSIBLE

QUICK SCREEN CHANGES

HERE IS THE NEW POSITIVE
DISCHARGE McNALLY DRYCLONE



NO "V-BELTS"
NO SPECIAL LUBRICATION

AN ACHIEVEMENT IN FUNCTIONAL DESIGN

STATE YOUR PROBLEM HERE OR ON YOUR LETTERHEAD

Send us your recommendations on how we may use the McNally Dryclone for drying our fine coals.

Surface moisture in feed_____

Desired surface moisture in centrifuged product_____

We (do / do not) have sieve analysis.

Name_____ Title_____

Company_____

City and State_____

☐ Have Sales Engineer call for further consultation.

C

The amazing simplicity of the working design of the McNally Dryclone is shown above. Completely self-contained 50 hp 720 rpm motor. Efficient direct drive. Lightweight cover easily removed and screen is changed in minutes!

*Here is one of the most efficient, trouble-free machines you can add to your preparation facilities. Use it for bigger profits in fine coal! Get information—send the postcard now.

**All this plus individually powered positive discharge of dried coal.*

ask **McNALLY PITTSBURG**
MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

The Men who know Coal from the Ground up

McNally Pittsburg Manufacturing Corporation—Manufacturing Plants: Pittsburg, Kansas • Wellston, Ohio Engineering and Sales Offices: Pittsburgh • Chicago • Rio de Janeiro • Pittsburg, Kansas • Wellston, Ohio

Maumee Endorses Spencer Product For Akremite Process

Bank-shooter charging drillhole with Akremite, Maumee Mine No. 20.

"We have employed in our experimental work in connection with the development of the AKREMITE Blasting process several grades and types of Commercial Grade Ammonium Nitrate, all of which may be successfully used in the process. Maumee has been using for the past year, or more, the Spencer Chemical Company product which we have found to be well adapted to our own use and in our experimental testing at a large number of shooting jobs on the properties of other mining companies."

HUGH B. LEE, President
Maumee Collieries

The principal material in the manufacture of Akremite is ammonium nitrate. Spencer Chemical Company, one of the world's largest producers, has developed a Commercial Grade Ammonium Nitrate especially for the Akremite Blasting Process. Spencer is prepared to supply your needs.

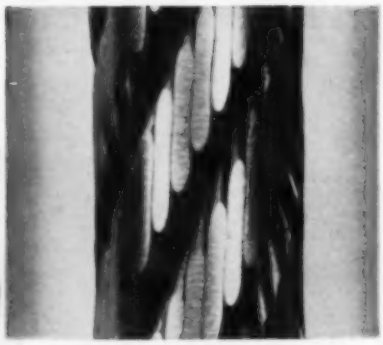
Please write or phone for further information.

SPENCER CHEMICAL COMPANY

610 Dwight Building • Baltimore 6600

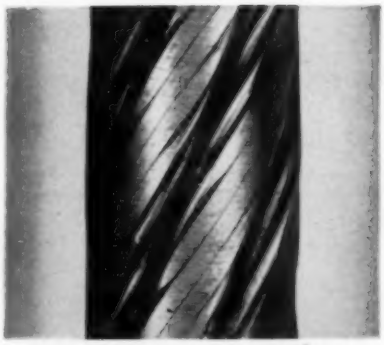
Kansas City, Missouri

Tuffy® tips on the "lays" and



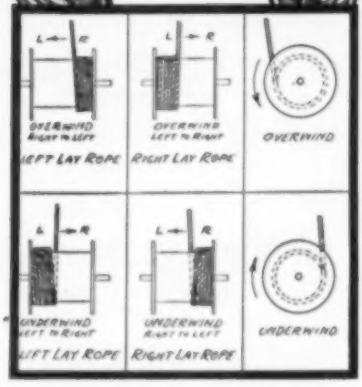
Partially Worn Regular Lay

Regular Lay ropes are used to a greater extent than Lang Lay, because Regular Lay wire ropes stand up better under the hazards of installation and use. Regular lay ropes are less susceptible to drum crushing and are not so readily damaged on sheaves of small tread diameter.



Partially Worn Lang Lay

Lang Lay ropes are about 15% more flexible than Regular Lay, and have a wearing surface *per wire* about three times as great. However, they crush out of shape more easily on small drums and are more easily damaged by sheaves with small tread diameter.



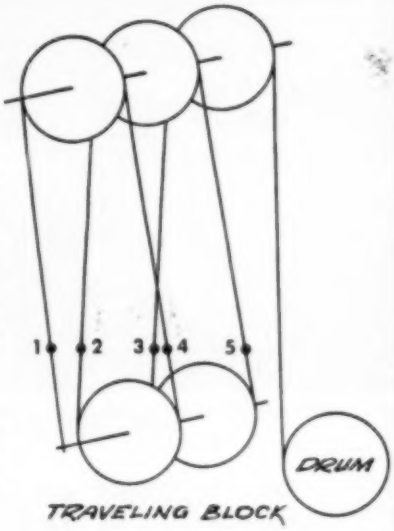
Rope Lay for One Layer Winding

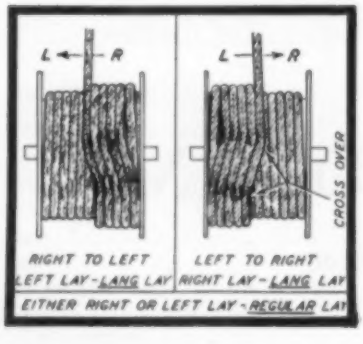
These diagrams show when it is best to use right lay or left lay rope on one-layer winding. The direction of winding is determined by standing behind the drum, looking toward the direction of the rope travel.

How To Count The Number of Parts Supporting the Load

The wire rope on many machines is not used in a single part or direct pull. It is often reeved through sheaves, which multiplies the power applied to the load. Drawing an imaginary line across the reeved rope parts, above or below the "crossing", and counting across gives you the number of parts supporting the load. Always include the rope end to the block, but not the part leading to the drum.

Send For Free Chart Which Allows Easy Figuring of Actual Stress On Rope For Any Given Piece of Machinery Reeving From One to Eight Parts.



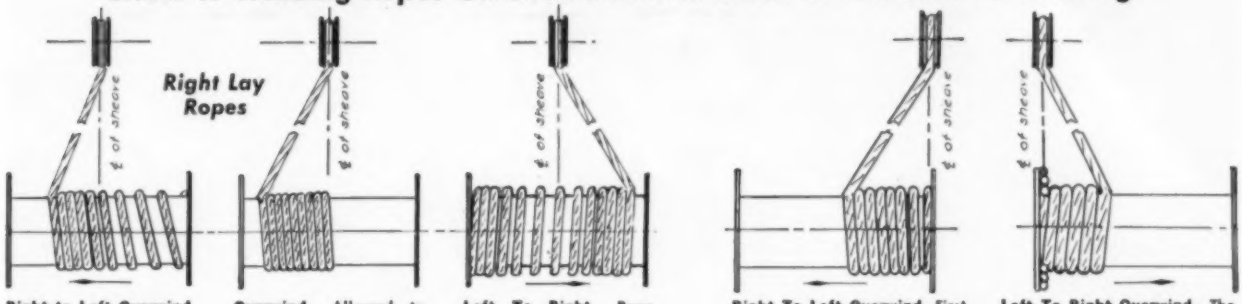


Rope for Two Or More Layer Winding

When a rope winds on the first layer across the face of a drum, it usually travels in a uniform pattern. But when it reaches the flange of the drum, the rope rides on the last strand of the first layer for one turn. Then, it slips into the grooves between each course of rope on the first layer. To move across the drum in this manner, the rope actually winds *back* a turn in each revolution. Then it must jump across *two* grooves in the first layer. This always occurs on the even-numbered layers, and often causes crushing. This abuse is minimized by use of properly designed grooves, spacers and lifters.

reeving of *Wire Rope*

Effect of Winding Ropes On Drums As The Result of Direction of Winding



Right to Left Overwind. Rope winds open to centerline of the drum, then it winds close.

Overwind. Allowed to run freely, the rope winds close to the left from center of drum.

Left To Right. Rope winds close the first four turns, open to center of drum, then close.

Right To Left Overwind. First two turns about 3/16" open, the balance close. Does not build up on flange.

Left To Right Overwind. The rope will build up three to four turns on flange before crumbling, then wind close.

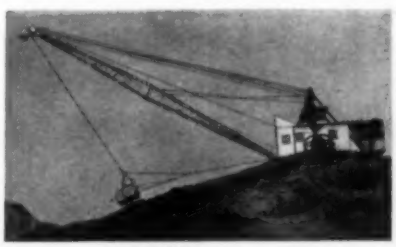
Yours For The Asking—The "Know How" of Specialists

Put your problems up to Union Wire Rope technicians who work closely and continuously with users and machine manufacturers to lengthen the service life of wire rope through both design and application.

Out of this exhaustive research has come the industry's greatest advancement—the Tuffy family of special purpose ropes that offer you the construction, operating characteristics and grade of steel that are best for the particular job for which each is constructed.

So thoroughly have the ropes of the Tuffy family been engineered that the chances of ordering the wrong rope is virtually eliminated. When you order Tuffy wire rope, you...

Stop Specification Complications—Say Tuffy



Tuffy Dozer Ropes

Constructed to increase rope life. 1/2" and 9/16" sizes on reels. Less frequent slip-through for cut off. No waste of sound rope.

Tuffy Dragline

Two big working advantages: (1) Outer wires have large area to resist abrasion. (2) Inner structure is flexible for accurate casting.

Tuffy Scraper Rope

Tailored to cope with the complex destructive forces imposed in the rush of making more round trips or in tough going.

Tuffy Slings

Constructed to stay extra flexible; kinking or knotting won't materially damage. Unique and strong 9-part machine-braided wire fabric construction. With Tuffy Hoist Lines, Tuffy Slings give you a team of balanced performers.

Tuffy Slusher Rope

A special 3-strand construction which combats rope killing conditions of slusher loading such as drum crushing, extreme abrasive wear and shock loading. Easily spliced.

Your Tuffy Distributor: Dependable Source of Information.

His job is more than just supplying the wire rope you want—when you want it. Your Tuffy distributor is always on the alert to help make your equipment do the best possible job, at the lowest possible cost. When you have a problem that calls for special knowledge concerning your equipment that uses wire rope, give your Tuffy distributor a call. He'll be glad to furnish the help you need including factory engineers.

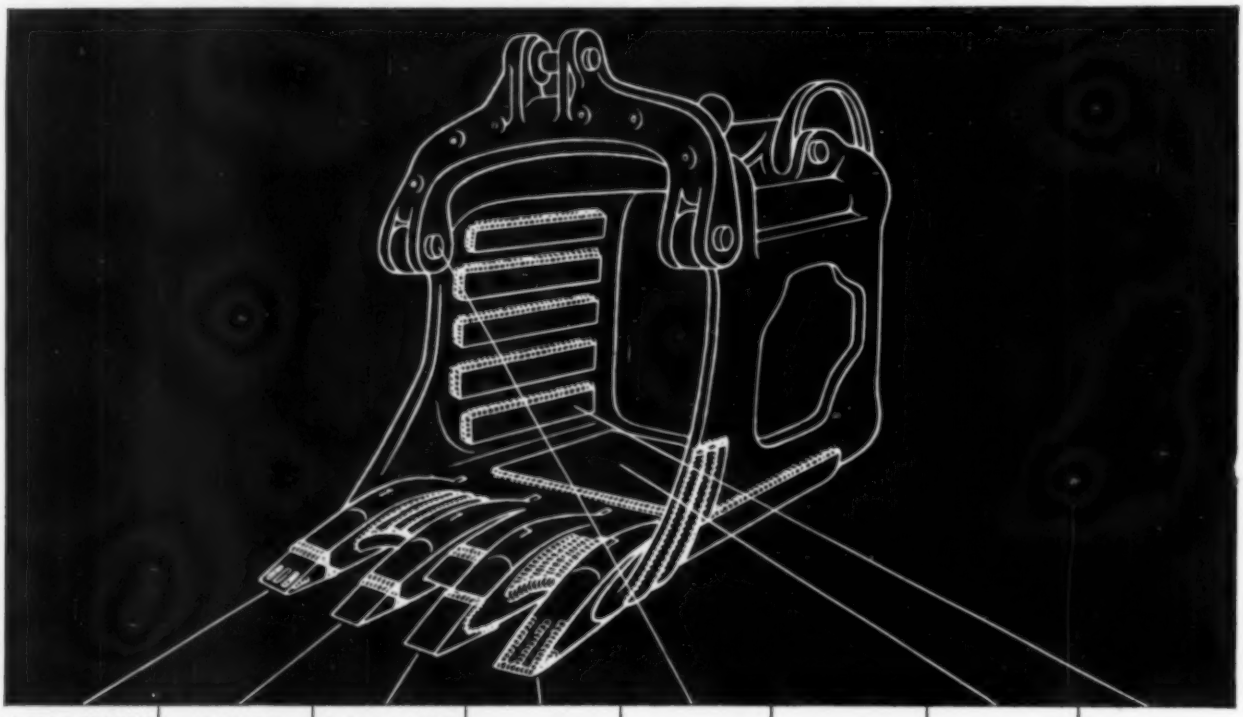
union Wire Rope **corp.**

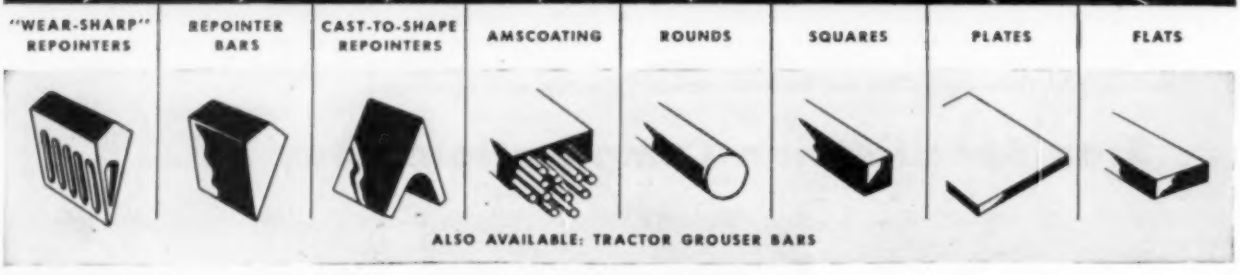
2130 Manchester Avenue, Kansas City 26, Missouri

Specialists in High Carbon Wire, Wire Rope and Braided Wire Fabric

●3-M

For EXTRA TOUGH build-up and repair





. . . use AMSCO® MANGANESE STEEL

Put manganese steel at the points of maximum wear and operate equipment longer between repair periods. Amsco manganese steel outlasts other steels by as much as ten to one under conditions of heavy impact and severe abrasion.

Impact work-hardens the metal to as high as 550 BHN. Further abrasion only polishes this tough steel. Amsco Bulletin WA-77 will show you how and where you can make extensive savings using Amsco manganese steel shapes. Write for it today.

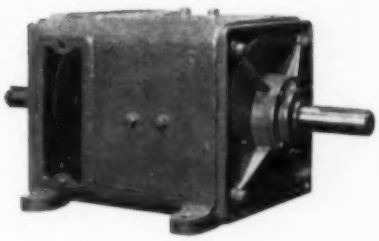
For immediate savings, contact your Amsco distributor. He stocks a complete line of manganese steel shapes and welding equipment. Welding products are distributed in Canada by Canadian Liquid Air Co., Ltd.

Amsco also produces other alloy steels with maximum wear-resistance under particular service conditions . . . and a complete line of hardfacing welding equipment, both rods and machines.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

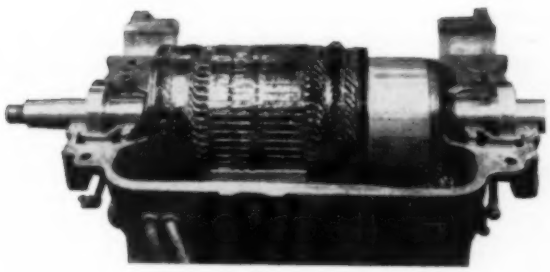
Hundreds of Conversions by Bearings, Inc.

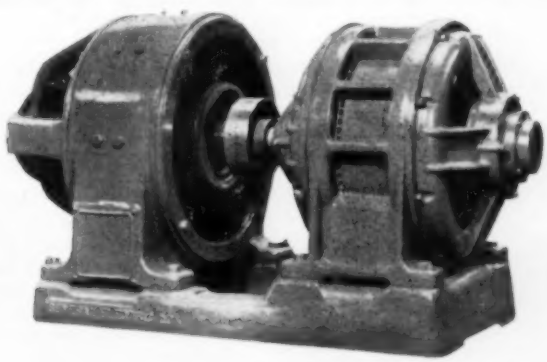


Prove the Value of Keystone Ball & Roller Bearing End Bells for GENERAL PURPOSE, CRANE & MILL MOTORS

Conversion of sleeve bearing motors to Keystone Ball or Roller Bearing End Bells has often meant really spectacular results in lower motor maintenance cost! Eliminating most armature changes and rewinding expense has often paid the cost of the conversion within a short time... And once installed, your Keystone Conversion requires no maintenance beyond a lubrication check once a year. Every Keystone bearing housing is permanently sealed against dirt and dust.

Hundreds of designs of all makes and sizes of general purpose, crane and mill motors are available for Keystone Conversions with little or no machining. Bearings, Inc. engineers will be glad to show you how the installation of Keystone Units can banish repetitive maintenance costs and at the same time give increased efficiency to your overall operation.





Bearings, Inc.

WEST VIRGINIA: Charleston • Huntington • Wheeling
PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York
OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
NEW JERSEY: Camden
Subsidiary: Kentucky Ball and Roller Bearing Co. • Louisville, Ky.

Bearings, Inc., 3634 Euclid Avenue, Cleveland 15, Ohio

Gentlemen:
I would like to receive a Keystone Application Manual.

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City ..... Zone ..... State .....

Emerald Coal and Coke Co. reported: **"Belts reinforced with Du Pont CORDURA** REG. U. S. PAT. OFF. **give topnotch performance under tough conditions"**

NOW Du Pont SUPER CORDURA makes belts even stronger

REG. U. S. PAT. OFF.

The two conveyor belts in use at the Emerald Mine, Clarksville, Pa., are subject to running conditions that include exposure to all kinds of weather, and the carrying of wet, cold refuse from the coal washer—yet they show no signs of wear after eleven months' trouble-free service.

The belts, reinforced with Du Pont "Cordura"* High Tenacity Rayon, carry 200 tons of material per hour. Manufactured by The Goodyear Tire & Rubber Co., the belts have caused no delays or shutdowns since their installation. The Emerald Coal and Coke Co., operators of the mine, report excellent all-round belt performance.

OVER-ALL VIEW of the two belts that are reinforced with Du Pont's "Cordura," at the Emerald Mine. Their total length is 4,632 feet, with refuse being carried from coal washer to dumper. Flow makes a 90° turn with a transfer station at the junction of the belts. The belts hug the center idler for better troughing and training throughout their run.

Now there's a new, stronger reinforcement available for conveyor belting—Du Pont "Super Cordura"† High Tenacity Rayon. "Super Cordura" has low stretch strength that permits belts that are stronger and more flexible. Downtime for take-up and resplicing is reduced to a minimum.

A product of Du Pont research, "Super Cordura" is 20% stronger than ordinary high tenacity rayon. You're assured of extra stretch resistance . . . extra flexibility . . . top performance under the most rugged conditions of use. Write us for the names of suppliers. E. I. du Pont de Nemours & Co. (Inc.), Textile Fibers Dept., Room 11506 Nemours Bldg., Wilmington 98, Delaware.

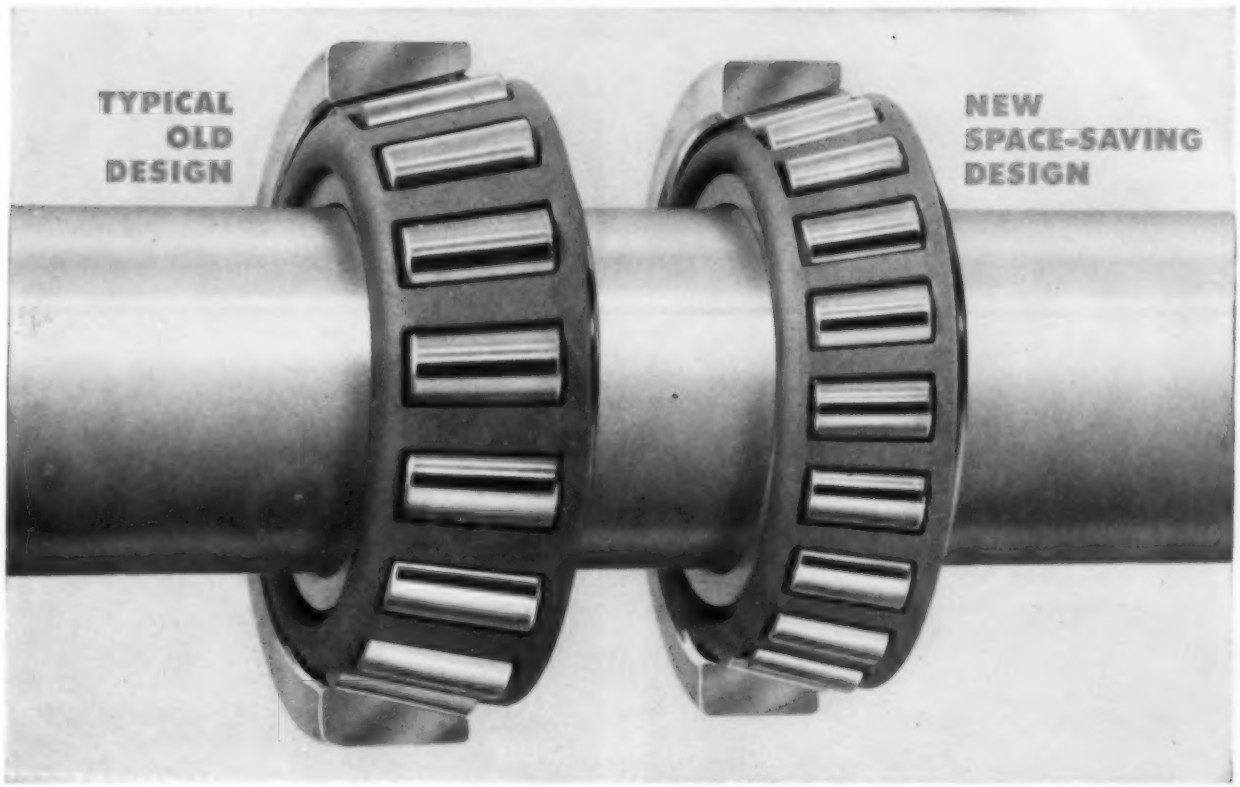
*Du Pont's registered trade-mark for its high tenacity rayon.
†Du Pont's registered trade-mark for its super-type high tenacity rayon.

DU PONT *Super Cordura*
High Tenacity Rayon

DU PONT
REG. U. S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

New capacity-packed TIMKEN® bearings for conveyor idlers cost less, weigh less, take less space



New design in 3/4" and 1 1/4" bore sizes offers new economies

TWO new Timken® roller bearings offer you an opportunity to cut the cost of bearing applications in *heavy-duty* conveyor idlers, as well as other applications where bearings with ¾" and 1¼" bore sizes are required.

The new Timken bearings cost less because they are substantially reduced in width and outside diameter compared to previous designs with the same bore sizes. The new bearings make possible other savings as well, since bearing housings can be made smaller, and smaller seals can be used. And the new bearings are packed with capacity—no other bearings have ever delivered so much capacity in so little space.

The new bearings have already proven themselves. In less than a year, over 1,000,000 of them have been put into use by leading car makers as front wheel bearings and in many other applications.

With the new Timken bearings you'll get all the proven advantages of Timken conveyor idler bearings, but at a lower cost than ever. Timken bearings practically eliminate friction because of 1) geometric design for true rolling motion, and 2) accurate manufacture that lives up to the design.

Full line contact between rollers and races gives Timken bearings the high load capacity you need in conveyor applications. And Timken bearings aren't just lubricated for "life", but lubricated yearly, or as conditions require, to insure *long* life. Fresh lubricant ends any chance of gummy, sticky, jammed bearings.

If you haven't seen the new Timken bearings, call your Timken Company representative or write: The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ont. Cable address: "TIMROSCO".

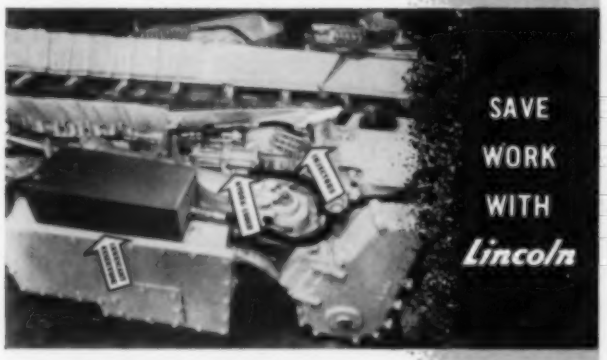
TIMKEN® ... your number 1 bearing **VALUE**

TRADE-MARK REG. U. S. PAT. OFF.
TAPERED ROLLER BEARINGS

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ⬮ AND THRUST ⬮ LOADS OR ANY COMBINATION ✳

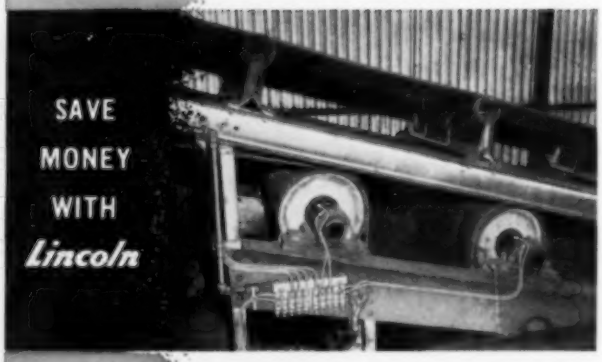
here's why **Lincoln** lubricating equipment

slashes operating costs IN MINES



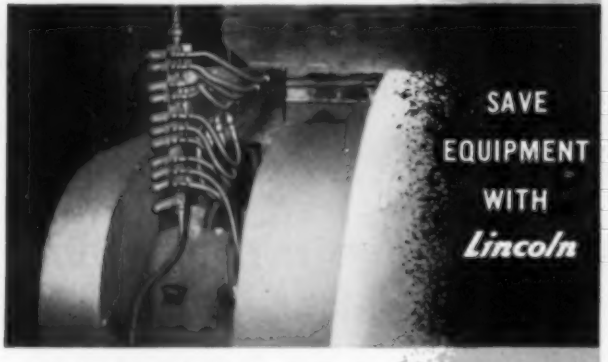
SAVE WORK WITH *Lincoln*

A Centralized Lubrication System frees manpower for other work . . . automatically lubricates 68 bearings simultaneously, on each loader, at Philip Sporn Mine.



SAVE MONEY WITH *Lincoln*

Centralized Lubrication Systems save Hanna Coal Company $32,240 a year in labor alone at their Georgetown preparation plant.



SAVE EQUIPMENT WITH *Lincoln*

A Lincoln Centralized Lubrication System automatically lubricates 500 bearings and increases the profitable working life of equipment at Wierton's Isabella Mine.

SAVE TIME WITH *Lincoln*

This unique Power Lubrication Unit is taken right to the job to speed up equipment maintenance at Perry Coal Company, O'Fallon, Illinois.

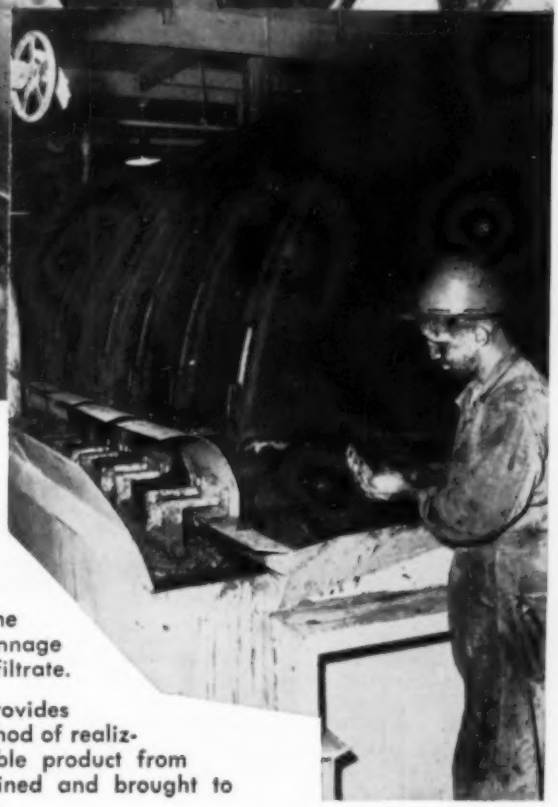
For more information about Lincoln Lubricating Equipment for the mining industries, write for Catalogs 64 and 80.

Lincoln

THE MOST TRUSTWORTHY NAME IN LUBRICATING EQUIPMENT

LINCOLN ENGINEERING COMPANY

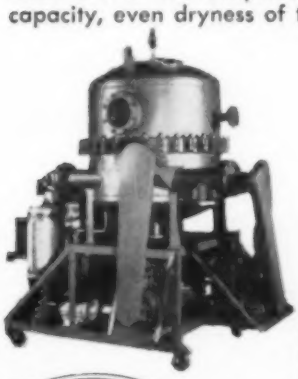
5729 Natural Bridge Avenue, St. Louis 20, Missouri



Smooth-Evenly Dried Coal Fines

Eimco Agidisc Filters are heavy duty continuous vacuum filters particularly suited to dewatering of fine coal.

The advantages of Eimco Filters in the dewatering of fine coals are in its completely automatic operation, high tonnage capacity, even dryness of the dewatered cake and a clear filtrate.



The use of Eimco Filters provides the most economical method of realizing maximum salable product from the tonnage mined and brought to the surface.

Eimco's Research and Development Center in Palatine, Illinois, has run exhaustive research studies on dewatering of fine coals. This data has been presented at numerous technical meetings in the States and Abroad. The findings of these studies are available to you — write for complete information.

Let us tell you what Eimco Continuous Pressure Filters can do for you in coal tars and coal derivatives.

B-113

THE EIMCO CORPORATION

Salt Lake City, Utah—U.S.A. • Export Offices: Eimco Bldg., 52 South St., New York City

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Cut costs with

CONSTRUCTION SPECIFICATIONS: Designed for dependability and safety. Type MPT is a product of Rome Cable research and engineering.

Power Conductor—ASTM Class B stranded, annealed bare copper, shielded with a semi-conducting tape.

Insulation—RoLene (polyethylene), complies with IPCEA and ASTM standards—suitable for maximum continuous conductor temperature of 75°C.

Electrostatic Shielding—Bare copper shielding tape over semi-conducting bedding tapes on each insulated conductor.

Grounding Conductors—ASTM Class B stranded bare copper—one grounding conductor in each interstice *in direct contact* with electrostatic shielding.

Assembly—Three shielded power conductors cabled with fillers and grounding conductors.

Sheath—Rome RoSeal, special black flame-resistant polyethylene, over the cabled and taped assembly—excellent mechanical and electrical properties.

For your other mining cable requirements the Rome 60 line includes:

- Parallel Duplex Shuttle Car Cables Types W and G
- Multiple Conductor Portable Power Cables Types W and G
- Type SO Portable Cords
- Single-Conductor Locomotive Cables
- Concentric Mining Machine Cables
- Multiple Conductor Combination Power and Control Portable Cables for Specific Applications,
- Shovel and Dredge Cables

new Rome • MPT

Mine Power and Industrial Feeder Cable—0 to 5000 Volts

NOW, you can cut the cost of mine power feeder cable installation. Rome Type MPT Mine Power Feeder Cable, specifically designed to be lighter in weight, smaller in diameter and, therefore, easier to handle than conventional rubber and Neoprene types of equivalent capacity, will save you real money. Further, you can economize with confidence, for in its construction, Type MPT represents the ultimate in safety for a nonmetallic sheathed cable.

Here is why you save with Type MPT:

- The original cable cost is less—as much as 28 percent in the case of 2 AWG 3-conductor, rubber and Neoprene sheathed—5 kv
- It is lighter in weight, compared to rubber and Neoprene . . . as much as 33 percent lighter in some instances
- Smaller diameters mean smaller fittings
- Greater ease of handling
- Long life because of its superior resistance to most chemicals, moisture, abrasion and mechanical damage
- Versatility of application

Where to install Type MPT

Rome Type MPT Mine Power Feeder Cable answers the needs of a variety of mine power problems. In addition, it is suitable for industrial use. Specifically, it is recommended for permanent or semi-permanent installation in a protected path, for example, in protected trays for horizontal runs or slopes . . . underground . . . end-suspended in bore holes . . . grip-suspended in vertical shafts or hung aerially from messenger and supporting insulators. Part of its versatility comes from its semi-portability, making it easy to relocate, whenever necessary.

It is safe

Rome Type MPT is designed for safe operation. Insulated power conductors are copper shielded for ground fault protection, while bare ground wires in direct contact with conductor shielding, assure low-resistance grounding in the event of shielding failure or ground faulting of equipment. Danger from fire is minimized by a high quality RoSeal (special flame-resistant polyethylene) sheath.

Rome Type MPT Mine Power Feeder Cable is available in sizes 6 AWG to 250,000 CM, generally as three-conductor and with ratings up to 5,000 volts. Let a Rome Cable sales engineer show you how Type MPT can save you money, safely. Contact your local Rome Cable representative or write Rome Cable Corporation, P. O. Box 71, Rome, New York.

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Now available in all kinds of mining equipment . . .

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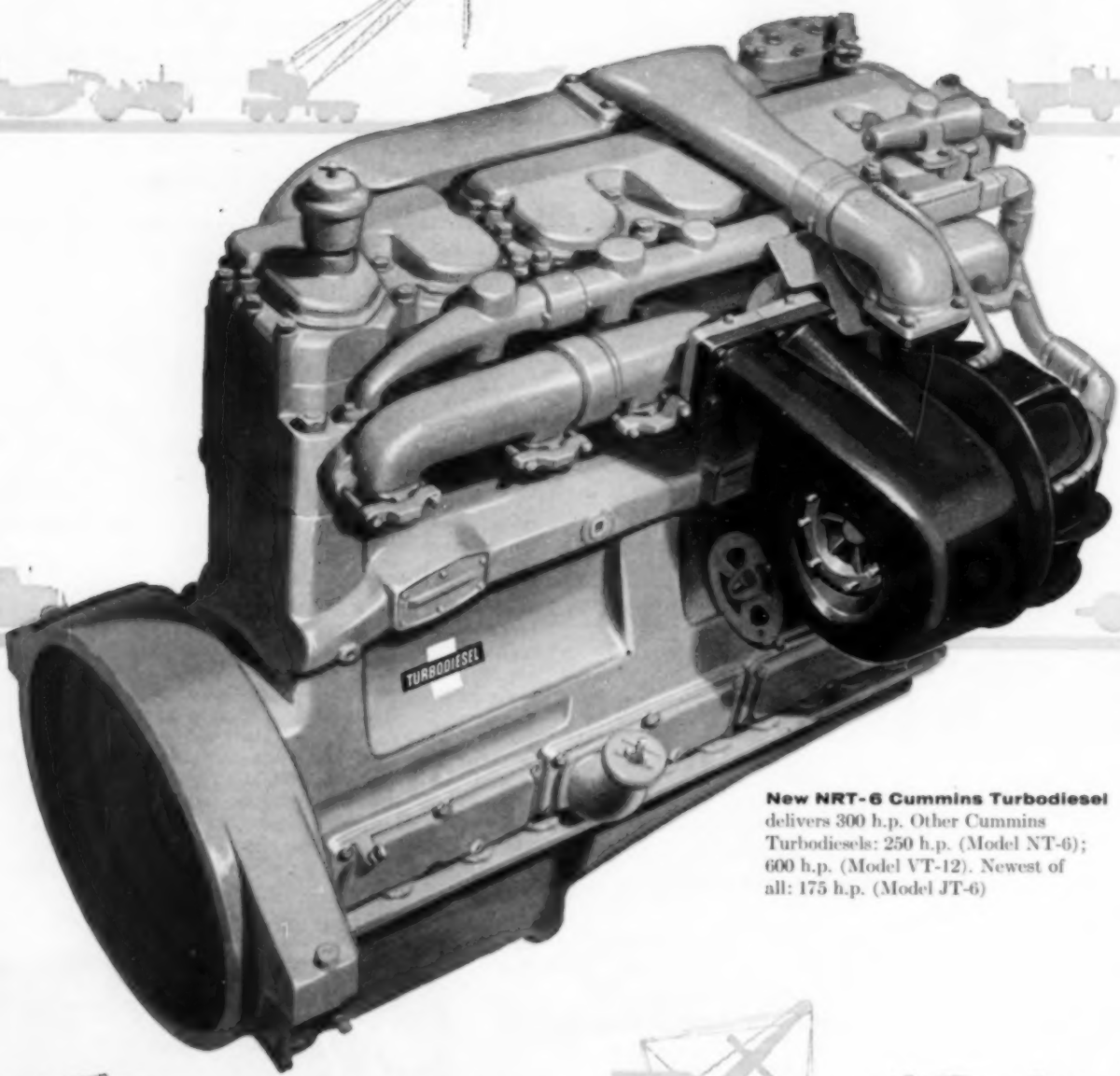

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Field tests on all kinds of mining and construction jobs show significant savings in time, fuel and equipment. And like all Cummins Diesels, the new Turbodiesels feature the simple to understand and service PT fuel system and easy-as-gasoline maintenance. Added time-saving economy feature: Cummins nationwide distributor system makes sure that factory-type service and genuine Cummins parts are always near *your* operation.

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Steel plates with hooks forged in and spike holes punched out—that's all there is to Bethlehem's Hook Frog Plates. Yet they fasten a frog more firmly in place than any other type of plate you'll ever find.

The hooks are larger and stronger than ordinary spike heads, and their holding power is independent of track action. Thus spikes are freed from direct pull. Both vertical and lateral thrust are checked, the frog is more tightly anchored, ties are protected from mechanical wear.

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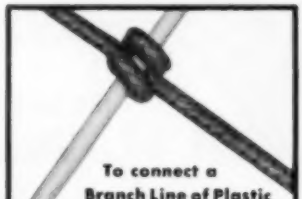

To connect a Branch Line of Plastic Reinforced or Plastic Wire Countered Primacord with the Trunk Line

use this DOUBLE HITCH in the textile-covered Primacord Trunk Line. *Draw it up as tight as you can, and make sure that the Branch Line leads off at a RIGHT ANGLE to the Trunk Line.*

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Devoted to the Operating, Technical and Business Problems of the Coal-Mining Industry

Coal Age

JULY, 1955

IVAN A. GIVEN, EDITOR

Ahead for Coal Too?

"AND, OF COURSE, it provides the principle upon which we are going to build the guaranteed annual wage."—*Walter P. Reuther, president, United Auto Workers, June 6, in discussing the Ford agreement of 1955.*

In these words, the man who has been making the biggest fuss about GAW—the "Guaranteed Annual Wage"—admits that he hasn't got it yet. Maybe he, or someone else, will get it in the future, or it may turn out that putting over GAW in reality is too much for even a Reuther. But Reuther did get Ford to agree to the principle that when it puts a man on its payroll it assumes at least part of the responsibility for seeing to it that his pay continues at a fairly high level for a considerable period of time if it lays him off.

The plan does not go into effect automatically. State and federal rulings must be obtained permitting payments to employees without having their regular unemployment payments reduced; permitting the company to class such payments as a business expense for tax and other purposes; and excluding the payments from computations under the Fair Labor Standards Act. But Ford and the union anticipate no difficulties on these scores, which means that it—and others who may accept the same plan in the future—eventually will be obligated, on the present basis, to make payments bringing the compensation of laid-off employees up to a maximum of 60 to 65% of base pay after taxes for up to 26 weeks. Ford is starting its kitty, from which the payments will be made, by contributions of 5¢ per hour per man.

Will the layoff-pay plan spread? There is reason to expect that it will, since it seems to have all the chain-reaction characteristics of other recent new developments in employer-employee relationships —portal-to-portal, welfare, pensions and the like. And if it spreads, it can be expected that the benefits will be liberalized and expanded—perhaps to the point where there is a guaranteed annual wage in reality, though, as noted, this latter may turn out to be too much for even its most ardent advocates. Meantime, preliminary estimates of the effect range from only minor difficulties in adjusting to the situation up to major hardening of the industrial arteries.

Has this development any meaning for coal? The answer necessarily is "Yes." Now that the UAW has broken the sound barrier, so to speak, the other unions will tend to follow. Will coal have to face the problem soon? Again it probably would be better to assume "Yes." Bituminous production is now running over 2 million tons a week ahead of 1954, and the prospects are that total output will exceed 440 and perhaps 450 million in 1955. This still leaves 1955 anything but a fat year, especially since 450 million is still short 50 million of the minimum the bituminous industry should be producing at the moment. But the industry is on the way up and 1955 is beginning to look like the year of the umpteenth round of wage increases. As a result, Lewis may conclude that the time is ripe for another move. If that move comes this year, it can be expected that layoff pay, or some other form of earnings guarantee, will be one of the demands.

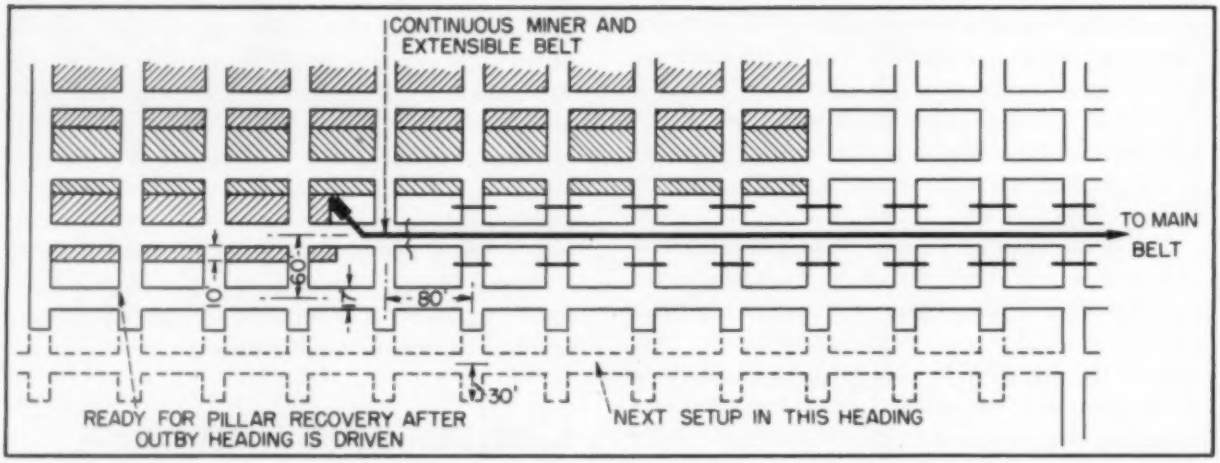
Conveyor Comeback

TIME WAS when the room-type conveyor, either hand-loaded or self-loading, was a most popular piece of equipment underground—so popular that 1,800 were sold to bituminous industry in 1941, plus 330 more to anthracite. Then the shuttle car got rolling, and in 1954 sales of room-type conveyors dropped to 61 in bituminous and 24 in anthracite. The shuttle car also took over from the mine car to a very large extent in face operations. But the conveyor is staging a comeback, both in its original form and in new types—the bridge unit, for example, and the extensible belt, which still serve face units but are radically different in design and field of application from the standard units of the past. Reason? Conveyors provide truly continuous transportation, and thus, other things being equal, make for the over-all continuity of production that cuts costs to a minimum.

HIGH-CAPACITY miner designed for thick seams works with extensible belt in 8-ft Pittsburgh seam.

BRIDGE CONVEYOR receives full stream of coal from continuous miner, carries it to extensible belt.

How Compass Coal Gears High



PILLAR-RECOVERY METHOD with continuous miner and extensible belt includes driving heading to limit, then mining pillars from both sides of previously driven heading as shown above.

DRIVE SECTION of extensible unit delivers coal from continuous miner to lateral belt. Note coarse coal.

ROOF BOLTING as miner advances is done by two-man crew operating bolting units mounted on the machine.

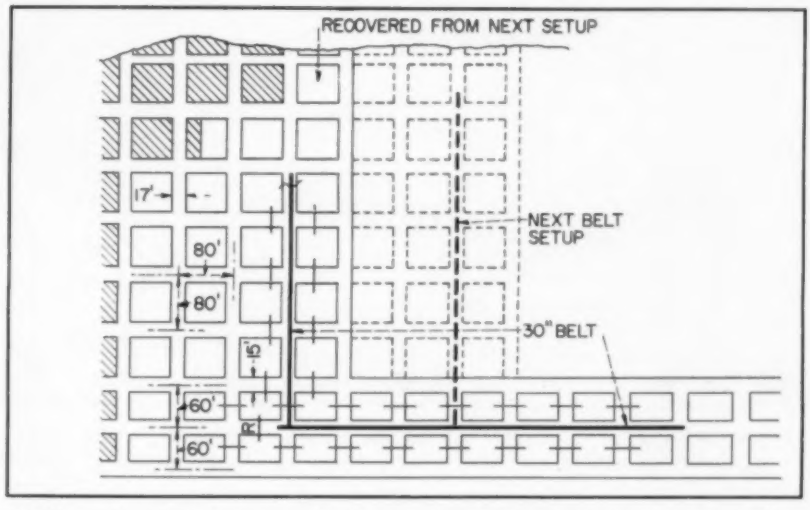
TAIL SECTION of 30-in extensible belt takes full load in stride, follows forward movement of miner.

EXTENSIBLE BELT is first 30-in unit teamed with continuous miner in thick seam, can be used up to 1,000 ft.

Output to Continuous Mining

Late-type continuous miner teamed with extensible belt and continuous unit served by shuttle cars work separate mining plans in all-belt operation, producing monthly averages of up to 69 tons per man-shift under adverse conditions.

Conventional off-track loaders in supplementary sections average 42 tons per faceman.



HOW continuous miner, two shuttle cars and belts are teamed in recovering pillars in modified-block panel mining at Compass Coal.

By A. E. FLOWERS
Associate Editor, COAL AGE

MORE COARSE COAL, higher output per man, continuous flow of coal from the face to the preparation plant and simplified mining are among the outstanding results achieved with continuous mining at the Compass Coal Co., Philippi, W. Va. The first continuous miner went into service in the fall of 1954 when Compass installed the first Joy 1-CM high-capacity unit. A second improved model of the 1-CM and a Joy extensible belt were added in March of this year.

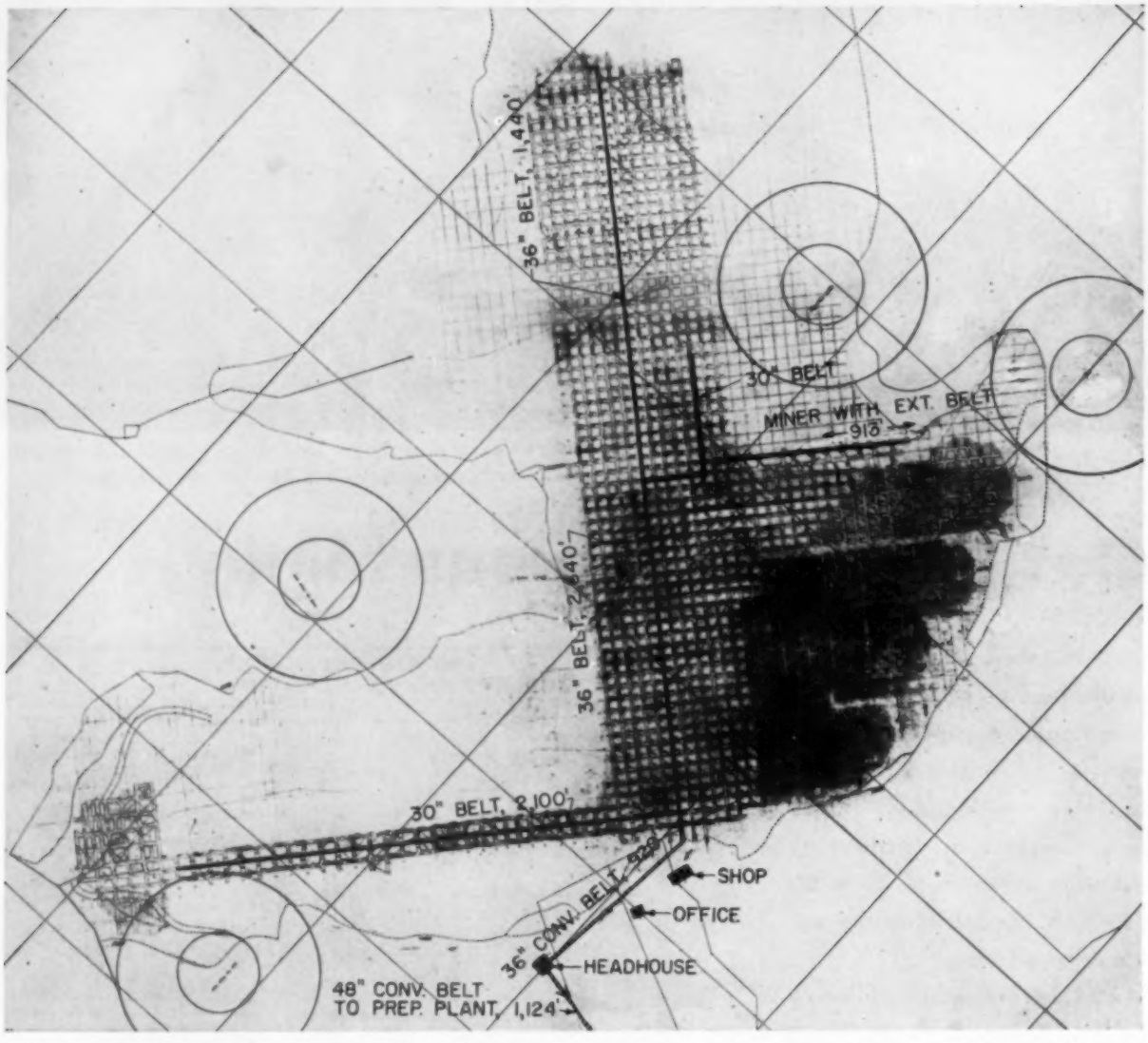
Both units have worked under conditions that are somewhat less than favorable and have given a good account of themselves. Among the adverse conditions encountered are clay veins, sulphur balls and bad roof. Production per shift has varied with the natural conditions but has exceeded 600 tons in areas with better conditions.

MINING WITH EXTENSIBLE BELT

A six-man crew and a foreman are assigned to the 1-CM miner and extensible-belt section. Duties of the crew are as follows: 1 miner operator; 2 roof-bolters; 1 mechanic; and 2 general laborers. The miner operator and roof-bolters handle all the work assignments at the face; while the other three men add belt and install intermediate sections in addition to handling other miscellaneous jobs and rotating as bolters and operators during the lunch period.

The continuous miner is an improved-design Joy 1-CM equipped with roof drills and capable of cutting to a height of 96 in. The 30-in extensible unit is the first one in service underground in thick coal. Neoprene-covered fire-resistant belt is used.

The miner-belt team was put to work in March of this year driving a heading and breakthroughs adjacent to a conventional-mining section. Although inexperienced with an extensi-



MINING PLANS at Compass Coal include all-belt haulage, continuous mining with extensible belt and shuttle cars and off-track mining with conventional equipment. Complete pillar extraction is practiced with all equipment.

ADDING BELT to 30-in extensible conveyor is easy job for three men who interrupt coal flow only 3½ min to splice in a 100-ft section. Extending conveyor at tail of extensible unit is done by two men (right) as miner rips out coal.

SECOND MINER works under wood crossbars supporting weak roof. Bolting equipment is to be added to machine.

SHUTTLE CARS are teamed with second continuous miner. Coal hauls are held to maximum of 240 ft.

ble belt and concurrent roof-bolting, the crew advanced 1,459 ft in 15 shifts, or nearly 100 ft per shift. Average production was 480 tons of raw coal per shift, despite the fact that the machine cut through six clay veins, hit numerous sulphur balls and encountered some bad roof. Shift output varied with the natural conditions but exceeded 600 tons of raw coal where conditions were good.

The continuous miner is operating in an area of Pittsburgh seam, averaging 8 ft in thickness. About 7 ft of coal is recovered in the mining operation. The remainder is left to provide a hard bottom for the machine and help support the roof. The seam is underlain by soft fireclay that disintegrates badly when in contact with water and is not solid enough to support the miner. The layer of coal left on the bottom is high in ash and sulphur and, since it is not mined, a higher-quality raw product is delivered to the cleaning plant.

The 1-CM rips out a channel of coal 42 in wide and 18 in deep in each movement from bottom to top. Five such cuts are made in the heading to make an opening 17 ft wide. Breakthroughs are cut 90 deg with the headings and driven halfway from each side.

BOLTING AND MINING

While the miner is ripping out the coal, the roof-bolters operate the two hydraulic rotary combination drilling-and-tightening units mounted on the sides of the continuous miner. The bolting crew follows a definite bolting pattern meshing with the miner advance. The procedure is as follows: Each man installs a vertical bolt as the miner removes the first 18-in cut across the face. After the miner moves ahead 18 in, the driller on the left side of the machine angles his drill 20 to 25 deg toward the center of the heading and installs a bolt on that angle. Following the next 18-in advance, the driller on the right side of the miner puts in a bolt angled toward the center of the heading. When the miner completes the third advance, the drillers install two vertical bolts and thus start the pattern again.

Roof drills are equipped with Carboloy carbide bits and the continuous miner with Kennametal and Carmet bits. Bolts are 5-ftx⅝-in high-carbon Bethlehem units fitted with Bethlehem expansion shells, 6x6x¼-in bearing plates and 1¾x1¾-in hard washers. The hard washers are placed between the bolt heads and bearing plates to reduce friction between the two. Thus the bolt can be tightened quicker.

While the three men at the face are busy producing coal and installing roof bolts, the mechanic and the two utility men clean up loose coal and add intermediate sections to the conveyor. When the extensible belt has advanced 50 ft, these three men add more belt at the drive end. They install a 100-ft section of belt in 3½ min, including separating the belt on the conveyor, splicing in the new section and spooling it onto the takeup cluster in the belt drive.

The two general laborers also extend the brattice cloth as the miner advances. Cloth is hung from spads driven into the top coal with an American spad driver. Rock-dusting up to the last breakthrough also is handled on shift with the aid of an MSA Bantam rockduster. Additional rock dust is applied by hand in the working area as needed.

After the heading was driven 950 ft to its limit, the extensible belt and continuous miner were removed and reset in a new heading. The job took 4½ hr, spent as follows: spooling up the 1,900 ft of belt and removing the idlers and intermediate sections, 5 men, 1½ hr; tramming belt tail section out, 1 hr 20 min; tramming continuous miner out, 1 hr 40 min.

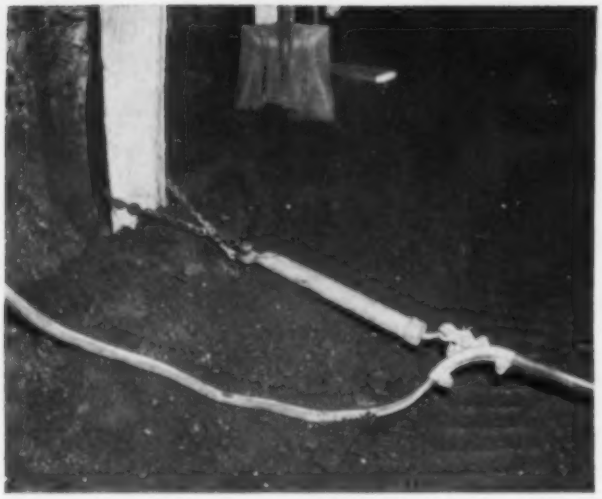
Power for the miner, extensible belt and a nearby lateral belt is provided by a 200-kw Westinghouse rotary converter and is transmitted to within 1,000 ft of the face by 1,500,000-cir mil copper circuits. A 1,000,000-cir mil line then carries power to within 300 ft of the face.

The 100-hp motors on the continuous miner are cooled by water circulated at 400 psi by a Bean pump. A 2-in pipe line carries water to the mouth of the belt heading and a high-pressure 1-in hose delivers it the remaining distance to the miner.

PILLARING WITH EXTENSIBLE BELT

Complete extraction of pillars is practiced with the miner and extensible belt team. After a heading is driven to its limit, pillars to the right are extracted completely and a 10-ft cut is taken from those to the left. The miner alternates from side to side, keeping both sides retreating at the same rate. After pillars are recovered from this setup, the miner and belt leap frog the next heading (previously driven to its limit) and drive a new heading, also to the belt limit.

After advancing the new heading 1,000 ft to its limit, the continuous miner and the head and tail sections of the belt are trammed back to the heading previously leap-frogged. The intermediate sections and belt are left in place in the newest heading for



CABLE ANCHORS increase life of shuttle-car cable by absorbing shock as car travels between face and belt. With this and other precautions, cables last 8 to 12 mo.

KEY MEN at Compass—Stephen Canonico, president (left); J. S. Mathews, division superintendent, Compass division; and Henry Weatherholt, Pursglove division superintendent.

use when the pillars are recovered. Therefore, only a minimum of time is needed to put the belt into operation when the miner and self-propelled end sections are trammed back into this heading.

In pillaring, a 10-ft slice is taken off the pillars to the left. Then, the remaining portions of the pillars, from which 10-ft slices had been removed in previous pillaring operations, are recovered. Thus the pillar-recovery method consists of driving a heading 1,000 ft with the extensible belt and removing partial pillars on both sides of the belt.

CONTINUOUS MINING WITH SHUTTLE CARS

Compass Coal's second 1-CM continuous miner is teamed with two 10-SC shuttle cars and a 30-in belt in a modified panel-and-block system. This miner is the first 1-CM to be put into service in the coal industry, and went to work in September, 1954, driving three headings.

The sequence of mining was designed to permit the miner to maintain maximum output with a minimum of place changes. To develop the entry, the procedure was as follows: Drive No. 1, or left, heading 100 ft; then drive No. 2 heading 100 ft; drive No. 3 heading 100 ft. Then cut a breakthrough 90 deg, on 80-ft centers from No. 3 to No. 1. All succeeding advances of the headings were 80 ft before the breakthroughs were cut.

After the second breakthrough was cut, a 20-in belt conveyor was set up in the middle heading. The continuous miner loaded directly into the shuttle cars, which alternated in carrying coal to the belt. To keep shuttle-car hauls to a minimum, belt extensions were made each 160 ft of advance. Thus, hauls were never more than 240 ft.

SUPPORTING BAD ROOF

Numerous clay veins and bad roof were encountered in driving the entry to a depth of 2,500 ft. Roof is supported by 6x8-in by 14-ft wood crossbars set on a maximum of 4-ft centers. Bars are set on steel jacks between shuttle car changes, and the jacks later replaced by wood legs.

To maintain a minimum area of unsupported roof, a triangular-shaped block of coal is left protruding in the center of the face after a 4-ft advance is made along the left and right sides of the working place. A crossbar is then set on steel jacks as close as possible to the edge of the triangular block. Then the center wedge is extracted and another crossbar is set at the face. After this, the cycle begins again and the left and right edges are advanced another 4 ft, leaving the wedge again. Management reports that this cycle of mining under wood roof support has been very effective in preventing rock falls at the face.

PILLAR RECOVERY WITH MINER AND SHUTTLE CARS

After the three headings were advanced to their limit, short rooms were driven off both sides of the entry and pillars were recovered. The body of coal on the right side of the entry widens toward the mouth of the entry and a second belt conveyor will be used to keep shuttle-car hauls to a minimum.

Rooms are driven in groups of three on 80-ft centers and 90 deg with the entry. Breakthroughs also are cut on 80-ft centers. When rooms become deeper and the room belt is needed, the pillars between the last two rooms will be left in and a new group of three rooms will be started. The belt conveyor will be installed in the middle room and they will be advanced in the same way the headings were.

The three inby pillars will be recovered to the left of the belt and the fourth pillar will be left in to be recovered from the next belt setup. Pillars are extracted in a flat line, starting from the inby room. The continuous miner removes a complete pillar, then moves to the adjacent outby pillar and removes it. Next the third pillar in line is extracted.

Production from the miner and shuttle car section has been materially affected by adverse natural conditions which includes clay veins, poor roof or a combination of both. To date, the best shift performance has been 604 tons of clean coal; best average output for a month, 425 tons. The section crew includes a miner operator, two shuttle-car operators, two timbermen, mechanic and foreman.

This unit recently was brought to the shop for a complete inspection and partial overhaul after mining better than 100,000 tons of coal and 990 shuttle cars of clay vein. In mining that tonnage and cutting through numerous clay veins, none of the original chains on the ripper head broke or wore out. Bit cost has been 7½c per ton. Management reports that the miner operated for periods of 2 to 3 wk without breakdowns on the operating shift. Repair and maintenance was done on the third shift so that the machine could be used effectively

during the production shifts to get maximum output.

CONVENTIONAL MINING

Continuous miner production is supplemented by output from three sections using conventional equipment. Two of the units are driving 14 main headings while the third is recovering pillars in an area adjacent to the extensible-belt installation. Headings and breakthroughs are driven on 60-ft centers.

Each of the sections is equipped with a Joy 11-BU loader, 10-RU cutter, two 10-SC shuttle cars, Jeffrey 56RB roof-bolter and Schroeder handheld hydraulic drill equipped with McLaughlin augers and Carboloy bits.

Power is transmitted to the equipment by Anaconda trailing cables. To obtain maximum life from shuttle-car cables, they are secured by Mosebach cable anchors that prevent jerking of the cables as the cars travel between the loader and the belt.

Trailing cables are in service an average of 8 to 12 mo before being replaced. Mine management lists the following as factors contributing to longer cable life at Compass:

1. Use of anchor devices on shuttle-car cables.
2. Hanging cables along the rib or roof where they won't be damaged.
3. Forbidding machine operators to run over any trailing cable.
4. Good voltage at the face, which prevents baking of the insulation.

Coal is top cut and sheared on the right rib to a depth of 9 ft with the universal cutting machines. Three or four blast holes are drilled per cut, depending upon the height of the cut. The cutter and the roof-bolting machine are equipped with hydraulic coal drills so that either crew can drill the coal. Each cut is broken down with 13 sticks of 1½x8-in permissible powder.

Production from the 12-man development crews, including the foreman and mechanic, averages 500 tons of clean coal per shift. Both units discharge onto the main 36-in belt installed in the No. 7 heading. One unit loads over the end of the belt and the other over the side.

The two crews advance the headings an average of 500 ft per month. Belt extensions are made after each 240 ft of advance, or about every 10 work days.

The third conventional unit works in an area laid out in a modified block system. Six rows of blocks on 60x60-ft centers are developed from the main entry to the outcrop. A 30-in belt conveyor is extended between the second and third rows as development progresses. As soon as the outcrop is reached, pillars are extracted on a 45-deg line.

COMPARATIVE SIZE-CONSISTS

Size	1-CM	Conventional Methods
Plus 2-in.	26.60%	29.50%
2 x 1¼	10.95	13.70
1¼ x ½	23.97	22.85
½ x ⅜	6.79	6.35
⅜ x ¼	7.70	7.17
¼ x ⅛	10.50	7.20
⅛ x 40M	10.36	9.96
40M x 100M	1.82	2.14
100M x 0	1.31	1.13

Size	Improved 1-CM (Avg. of 5 Tests)
Plus 2-in.	31.22%
2 x 1¼	12.28
1¼ x ¾	15.24
¾ x ⅜	15.57
⅜ x ¼	6.41
¼ x ⅛	7.23
⅛ x 0	12.05

Management points out the following advantages of developing the 60x60-ft blocks and extracting pillars immediately after development to the outcrop:

1. A maximum number of working places is available on the advance since headings and breakthroughs can be worked at the same time. If blocks were larger, headings would have to be stopped until breakthroughs were cut through.
2. Roof is exposed a minimum time before pillars are extracted and therefore does not deteriorate.
3. A complete block of coal can be extracted in nine working shifts. Thus in periods of slack work there are no small stumps left standing.

Roof is supported both on advance and retreat by 5-ft expansion-type roof bolts. To provide additional support in open-end pillar extraction, straight wood posts are set as needed along the gob side of the pillar.

VENTILATING THE MINE

Fresh air is delivered to the working areas by a Jeffrey Aerodyne Jr. fan exhausting 100,000 cfm of air at a 0.3-in water gage. The main intake is split into three primary circuits: one for the main headings, one for No. 1 left and the other for No. 5 right. In addition, each of the underground belt conveyors is ventilated by a separate split. Belt conveyors are separated from the primary circuits by rows of concrete-block stoppings along both sides of the conveyor.

SUPPLYING THE MINE

All underground supplies are delivered on the day shift by Joy 42D shuttle cars powered by Exide and Gould batteries. Two cars are used regularly for supplying and a third unit is maintained as a spare. One man is assigned to each car to load, deliver and unload underground supplies. One of the cars also is used on the third shift by the maintenance crew, which greases, inspects and lubricates mining equipment. As the mine workings become more extended, new supply and man portals are opened about 2,500 ft apart. Travel time and supply-hauling time therefore are kept to a minimum.

DRAINING MINE WATER

About 800,000 gal of water is removed from the mine every 24 hr. A group of Gould and Deming reciprocating pumps is assigned to gathering duties and Deming centrifugal units are used at permanent pumping locations. Water is pumped through 2-in Carlon plastic pipe in the gathering circuits while 3- and 6-in plastic pipe is used for main lines.

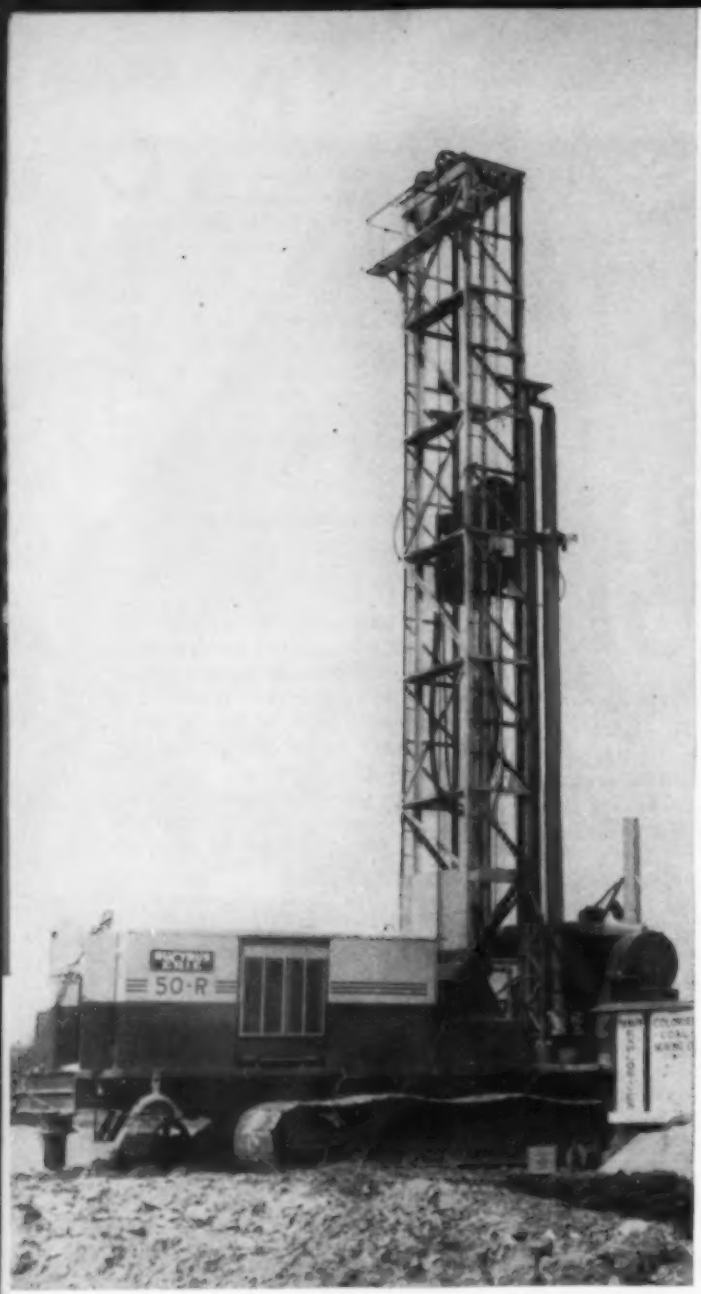
The coal bed lies comparatively flat with small, short, deep swags and therefore ditches cannot be used effectively for draining inflow.

CONTINUOUS BELT HAULAGE

A network of belt conveyors ranging from 30 to 48 in wide and 920 to 2,640 ft long carries the coal from the mine to the preparation plant. The last stage, from a 480-ton storage bin on the outcrop level to the cleaning plant in the valley, is by a 48-in declined conveyor 1,126 ft long. The system from the storage bin to the head of the main entry is made up of three 36-in Goodman conveyors equipped with roller switches that control belt movement. These units are equipped with U.S. rubber belt.

The No. 1 belt is 920 ft long and provides a link between the storage bin and the mine portal. Extending into the main entry, the No. 2 belt extends 2,640 ft from the portal into the main entry and is followed by the No. 3 conveyor, which also will be extended to 2,640 ft as the main headings are developed. A fourth unit then will be installed in tandem with No. 3. A 50-hp AC motor powers the No. 1 belt and 100-hp motors drive the longer units. All splices in the main belts are vulcanized. Secondary belts carrying coal from the producing areas are 30-in Joy and Goodman units.

Belt extensions are made by five men from the section crew plus an additional man who is a specialist in installing conveyors. This six-man crew adds 240-ft of 36-in conveyor in 6½ to 7 hr, including leveling the sections. They can add the same length of 30-in conveyor in about 6 hr.



New Explosive and . . .

High-Capacity Drill . . .

Keys to

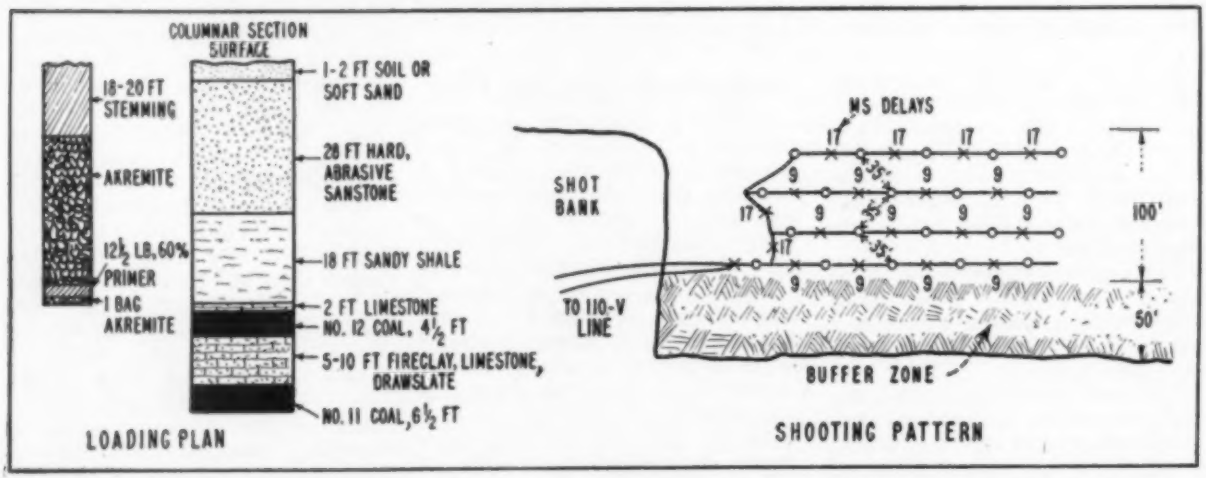
What New Methods Achieved . . .

1. A 75% reduction in the number of blastholes needed in 45-ft. highwalls, and an 88% reduction in thicker overburden.

2. Handling of drilling and shooting on one shift by a three-man crew. Formerly required two shifts and 10 men. New drill keeps well ahead of stripping and sometimes is idle, permitting crew to be assigned other duties.

3. Savings of 40 to 60% over cost of conventional explosives with application of new Akremite explosive for blasting.

4. Increase in stripping rate of 90 cu yd per hour as result of better fragmentation with the new-type explosive and large-hole drill.



LOADING PLAN for Akremite includes 12½-lb primer of 60% dynamite and 18 to 20 ft of stemming at top of hole. **SHOOTING PATTERN** (right) features four rows of staggered holes. Millisecond delays improve fragmentation.

TRACTOR-MOUNTED DRILL sinks blastholes in limestone over No. 12 coal and in the layer between the coal beds.

TANDEM STRIPPING is practiced when overburden gets over 50 ft. Units work separately in thinner cover.

Better Stripping at Colonial

OPPORTUNITIES TO CUT COST still exist in strip mining. Proof of this are the steps taken in the past year at the Colonial Coal Mining Co., Madisonville, Ky. Purchase of a high-capacity rotary dry-type overburden drill and application of a new-type explosive keyed big savings at Colonial.

SEARCHING FOR NEW METHODS

Colonial began its search for better drilling and blasting techniques in December, 1953, when J. A. Miner, president, visited Maumee Collieries to observe a Bucyrus 50-R drill in operation. At the same time, he witnessed the results of breaking overburden with Akremite, a new-type explosive which was developed at Maumee (*Coal Age*, May, 1955, p 70).

Mr. Miner had been interested in an Akremite-type explosive for some time but efforts by his company to develop a similar product had been unsuccessful. The Akremite in use at Maumee appeared to offer real possibilities for reducing explosives cost and at the same time achieved excellent fragmentation.

As a result of the visit to Maumee, a 50-R drill was ordered for Colonial's operation in western Kentucky. Shortly after the drill was delivered in March, 1954, Colonial was licensed by Maumee to manufacture Akremite. Construction of facilities for storing ingredients and mixing the Akremite was started in April, 1954. By May, Akremite was being mixed in the Colonial plant.

Part of the first batch of 16,000 lb was used in daily experiments to learn as much as possible about the new explosive. Before using it for breaking overburden, representatives of the state Department of Mines were invited to witness a series of demonstrations designed to show the safeness of Akremite.

Here are the tests and results:

1. Primacord was wrapped around a 50-lb cartridge of Akremite and detonated with an electric blasting cap. Result—bag of Akremite was cut but did not detonate.

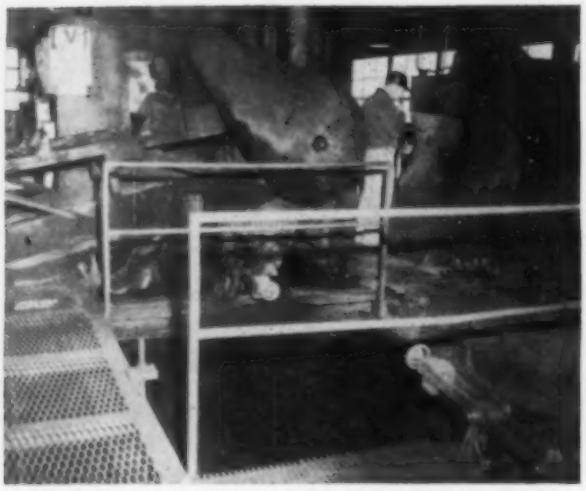
2. Four vertical blastholes were drilled 10 ft deep. A 20-lb cartridge of Akremite with a blasting cap was placed in the first hole and filled completely with stemming. When the cap was detonated no sound was heard and it would have been impossible to have known it detonated without the aid of a galvanometer.

3. Next, 20 lb of Akremite and 1 lb of a slow 30% gelatine with an electric blasting cap were placed in the hole and fully stemmed. When the charge was detonated, it was barely audible.

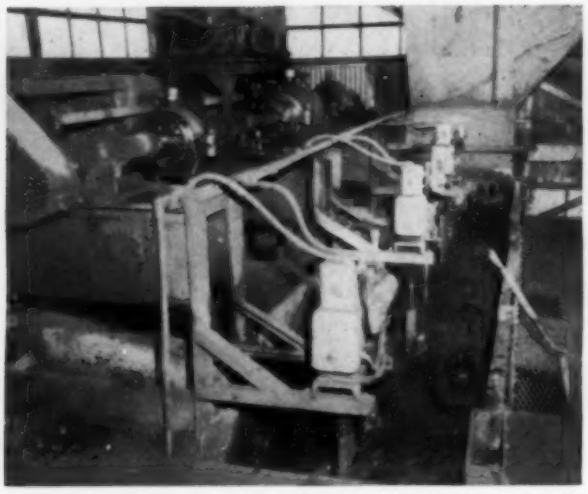
4. The third hole was charged with 20 lb of Akremite and 1 lb of 40% gelatine with an electric cap as a primer. This shot raised the top of the hole and a small quantity of smoke was emitted.

5. The fourth hole was loaded with 20 lb of Akremite and primed with

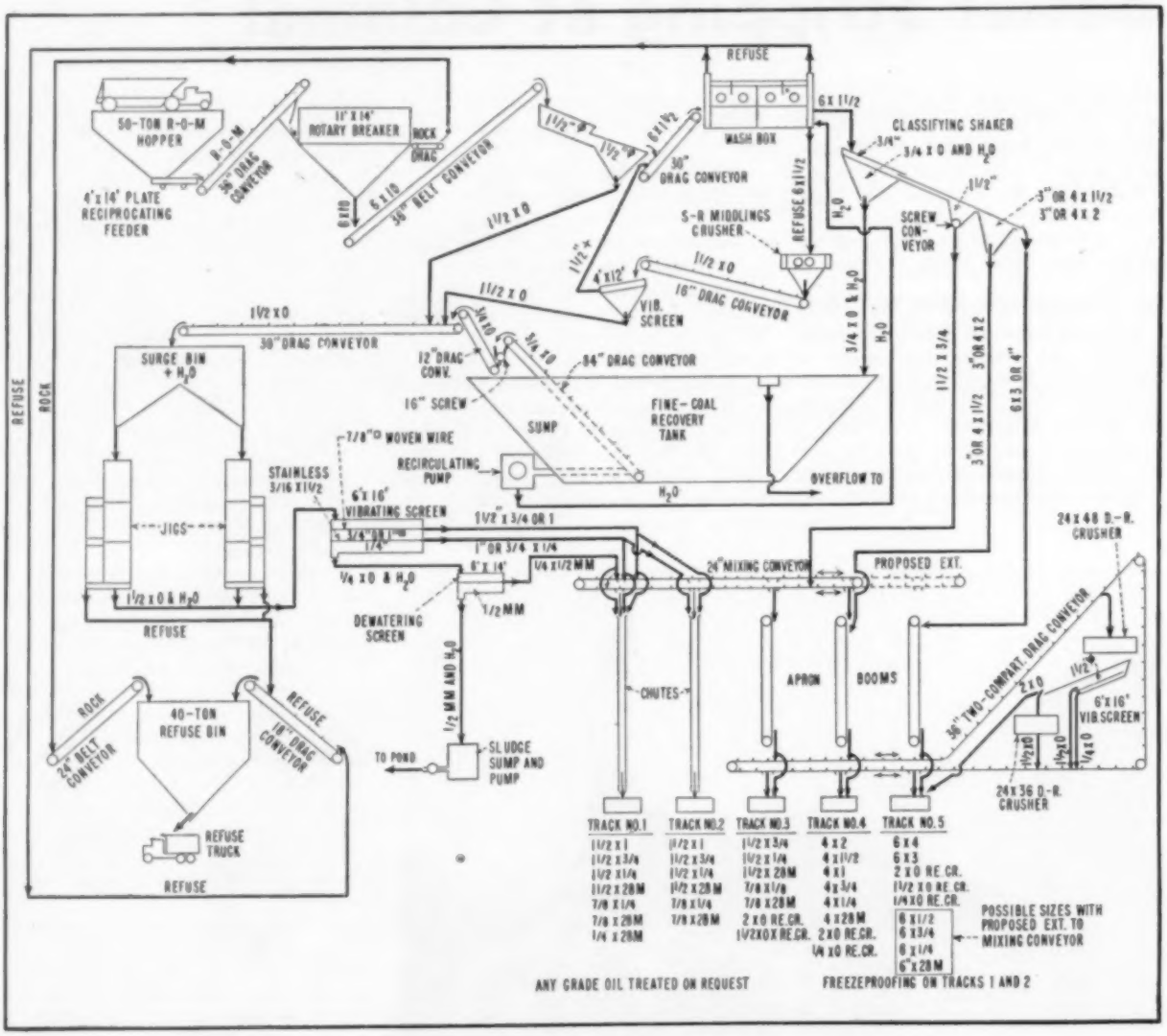
COAL LOADING into 40-ton dropbottom trucks is assigned to 6-yd shovel on No. 12 level and to 4-yd unit in No. 11 pit.



WASHING of 6x1½ is done in wash box making three-product separation into clean coal, middlings and refuse.



FINE-COAL WASHING of 1½x0 raw coal and middlings is assigned to this pair of jigs.



FLOW DESIGN at Colonial includes separate washing of coarse and fine coal, Clean-coal crushing and rescreening, oil treating and freezeproofing.

PREPARATION of 3,000 tpd of coal from the Nos. 11 and 12 beds is assigned by Colonial Coal Mining Co. to this modern plant.

PRESIDENT J. A. Miner sparks Colonial's operation. Radio permits C. A. Kelly, superintendent, to contact pit or office from any point on property.

1 lb of 60% gelatine and an electric blasting cap. This shot resulted in complete detonation of the Akremite.

The tests demonstrated that Akremite does not act as an explosive unless it is correctly confined and detonated with the correct primer charge. Other experiments, such as dropping a weight down a pipe onto a container of Akremite, burning and so on, caused no explosion and further demonstrated the insensitivity of the new explosive.

The mine inspectors were well pleased with the results of the tests and the apparent safety of the new-type explosive. Although all tests demonstrated the insensitivity of Akremite, Colonial still handles it with all the precautions required with conventional explosives.

DRILLING PROGRESS

Immediately after the new drill arrived, a series of drilling patterns were tried in an effort to get the most efficient results from Akremite. Some seven or eight drilling patterns, including 25x25-, 25x27- and 25x30-ft rectangles, were tried. However, deck loading was necessary with these spacings to maintain the ratio of 1 lb of explosive to 3¼ cu yd of overburden.

Since a large portion of the overburden consists of hard sandstone, full-column loading was found desirable for good fragmentation. Therefore holes were spread apart as far as possible to permit full-column loading, leave room for 18 to 20 ft of stemming and yield 3¼ cu yd of overburden per lb of explosive. The pattern developed for average conditions includes three or four rows of staggered holes with 35 ft diagonal distance between them and shooting against a 50-ft buffer of shot bank. Details of the pattern are shown in an accompanying diagram.

Shortly after the 50-R drill went into service, management learned that the hardness of a particular strata of formation varied and could be detected by a change in drilling pressure. The changes in hardness were enough to convince management that logging a drillhole by type of rock was not enough and wasn't too helpful in determining the quantity of explosives needed. To provide a more reliable method of recording the varying hardness, an electric depth-measuring device was developed at the mine (*Coal Age*, May, 1955, p 122). This permitted explosives to be used more economically and the hole pattern could be changed as desired.

Before the 50-R drill went to work, Colonial had two company-designed rotary drills assigned to drilling. Both operated two shifts and were manned by two-man crews who averaged about 350 ft of 6-in hole per shift.

To maintain the explosives ratio of 1 lb to 3¼ cu yd of overburden, the company-designed drills had to put down 36 holes per 100 ft of advance when the overburden was 45 ft or less. When cover exceeded 45 ft, it was necessary to bench shoot, which required 72 holes for each advance of 100 ft.

When the new 50-R was put in service, hole spacing was changed to 25x25-ft squares, thereby reducing to 16 the number of holes required per 100 ft of advance. Deck loading with conventional explosives was practiced.

A further gain was made by going to the full-column shooting and increasing the distance between holes so that only nine holes were required for each 100-ft advance. The 50-R drilled a 10⅝-in hole as compared to the 6-in hole with the smaller drill. Therefore 9-in-diameter powder could be used in place of 5-in. As soon as the new Akremite was available, it was used in place of conventional explosives.

The 50-R is operated by a three-man crew which also charges holes with Akremite as they are drilled and fires them at the end of the shift. In one shift these three men are able to handle the work that formerly required two drill crews working two shifts and two or three extra men who came into the pit to load and shoot holes after they were drilled.

The three-man crew drills an average of 125 ft per hour with the 50-R while handling the loading and blasting job. In an average day they drill 875 ft of hole and load 13,600 lb of Akremite. They have drilled as much as 944 ft in one shift. Drill bits are Hughes OSCIJ and usually drill 8,000 ft of hole before they are worn out.

Blastholes are drilled to the top of

a 3-ft layer of limestone overlying the No. 12 coal. Akremite is delivered to the pit in special explosives wagon drawn by an Oliver tractor. During wet weather, a Caterpillar bulldozer is used to handle the wagon in the soft ground. To aid the drilling crew in loading blastholes, a loading chart is posted inside the wagon. On it are listed the quantity of Akremite to be used per hole for the various hole spacings to yield 3¼ cu yd of material per lb of Akremite. The ratio between explosives and overburden always is maintained at 3¼ to 1. If the cover gets shallow, hole spacing is changed to maintain the stemming at 18 to 20 ft and the powder ratio at 3¼ cu yd per lb.

Primacord and du Pont 15-millisecond delays are used along with the high explosives to detonate holes in a standard pattern. Management reports that the delays have reduced the intensity of shock and improved the fragmentation.

STRIPPING AND LOADING

Flexibility and close coordination are the keynotes of the stripping and loading cycles at Colonial. A Marion 7400 electric dragline with a 175-ft boom and 12-yd Esco bucket is teamed with a Bucyrus-Erie 9W dragline with a 200-ft boom and 8-yd bucket to remove overburden down to the 3-ft layer of limestone overlying the No. 12 coal. If the overburden is less than 50 ft thick, the units work in separate pits. When cover ranges between 50 and 70 ft, they operate in tandem.

In the higher banks, the 7400 removes the upper two-thirds of the overburden, piling it within 15 to 20 ft of the edge of the coal. The 9W, with its longer boom, works closer to the spoil and follows the 7400, removing the lower third of the material and placing it behind the spoil handled by the 7400. This leaves the 3-ft layer of limestone over the No. 12 coal exposed.

Two twin-arm rock drills, mounted on D8 Caterpillar tractors, then move in to sink 1¾-in vertical blastholes on 6-ft centers in the limestone. One of the units pulls a 600-cfm Worthington compressor while the other has a direct-mounted Jaeger unit. One of the drills is equipped with two Cleveland jackhammers and the other with two Gardner-Denver units.

It takes only a short time for the two units to drill a round of 100 holes in the thin limestone. Holes are charged with Hercules or Egyptian 1½-in 40% gelatine. Removal of the blasted material is assigned to the draglines.

After the No. 12 coal is removed, the 3- to 10-ft layer of limestone between the two coal seams is drilled by the tractor-mounted units and blasted on the day shift. A 170B electric shovel with a 6-yd combination rock-and-coal dipper loads coal on the day shift and then is trammed to the broken limestone where it works on the second and third shifts uncovering No. 11 coal. At the end of the third shift it is moved back into the coal pit in position for loading coal on the day shift. A 54B shovel with a 4-yd Esco divided dipper loads coal from the No. 12 pit.

A fleet of five 40-ton Euclid drop-bottom trailer trucks powered by Cummins diesel engines haul coal about 2½ mi to the Colonial preparation plant. When the haul is extremely long or one of the 40-ton units is in the garage for maintenance work, a spare truck made up from a White or Euclid tractor and a 25-ton United Iron Works trailer is put in service.

Each truck driver makes a daily report of the condition of his truck to the maintenance foreman at the end of the shift. Trucks are parked in a heated building where they are serviced and any necessary maintenance work done.

RADIOS IMPROVE EFFICIENCY

Efficiency of operation has been improved by installing Motorola short-wave radios in the shop, office, superintendent's car, chief electrician's truck, 7400 dragline, 170B shovel and patrol car. With radios in these key locations, supervisors and maintenance men can be contacted immediately and help can be dispatched to the trouble spot in a matter of minutes. Thus time lost because of equipment failure can be kept to a minimum.

PREPARING THE COAL

Coal from the 50-ton raw-coal bin is transferred by a 4x14-ft reciprocating plate feeder to an 11x14-ft rotary breaker. There it is broken to 6x0 and the large rock is scalped off and carried to the refuse bin. The 6x0 is deposited on a 36-in belt conveyor and delivered to the primary raw-coal shaker screen and separated into 6x1½ and 1½x0 fractions. The 6x1½ drops onto a 30-in drag conveyor that delivers it to a McNally-Norton No. 5 wash box for separation into clean coal, middlings and refuse.

Refuse flows to a drag conveyor and is deposited in the refuse bin. Middlings pass through a single-roll crusher, are broken to 1½x0 and carried by a 16-in drag conveyor to a 4x12-ft Low-Head vibrator whose job is to remove the plus 1½-in oversize. The oversize is recirculated to the wash box and the 1½x0 crushed middlings join the 1½x0 from the primary shaker on a 30-in drag conveyor carrying the combined product to a surge bin feeding two Ore Reclamation Co. jigs.

Clean 1½x0 passes to a 6x16-ft Allis-Chalmers Low-Head vibrator and is separated into 1½x¾ or 1½x1, ¾x¼ or 1x¼ and ¼x0 sizes. The two larger sizes may be loaded separately on Tracks 1 and 2 or dropped onto a 24-in mixing conveyor and mixed with slack before loading. The ¼x0 from the vibrator separation is delivered to a second Low-Head vibrator equipped with Bixby-Zimmer ½-mm stainless-steel screen cloth and dewatered and separated into ¼-inx½-mm and ½mm x0 products. The larger size is delivered to the 24-in mixing conveyor and the ½mmx0 flows to a sludge sump. An 8x10 Wilfley centrifugal then pumps it to a settling pond.

Clean 6x1½ goes to a shaker classifying screen and is separated into ¾x0, 1½x¾, 3 or 4x1½, 3 or 4x2 and 6x3 or 6x4. The ¾x0 flows to a fine-coal recovery tank fitted with an 84-in drag conveyor that discharges the solids onto a 16-in screw conveyor which in turn discharges into a 12-in drag for emptying into the conveyor carrying raw 1½x0 to the O.R.C. jigs.

The 1½x¾ is deposited on a screw conveyor and delivered to the mixing conveyor spanning the four loading tracks. The nut and egg sizes are deposited directly onto the loading booms on Tracks 4 and 5.

All of the No. 12 coal is reduced to 1½-in top size, and therefore management has provided a separate clean-coal crushing and rescreening plant adjacent to the washing plant. The plant also is used to make additional stoker coal from the clean No. 11 coal. In recent years, Colonial's markets have become primarily industrial and utility, requiring the smaller sizes. There is a differential in freight rates in favor of fine coal going north and therefore management concentrates in the smaller sizes.

Colonial Officials

J. A. Miner, President and General Manager

J. E. Kennett, Assistant Secretary

C. A. Kelly, Superintendent

Dexter Humphrey, Engineer

A. Mitchell, Electrician

Luke Shoulders, Preparation Manager

Paul Lyon, Drilling and Shooting Foreman

Josh Hudson, Shop Foreman

Herbert Scott, Night Shop Foreman

The Coal Commentator

A Little Soon

Washington, May 26—They had come to praise the steam locomotive, not to bury it. That, at least, was the anguished explanation of Interstate Commerce Commission officials who trooped down to the lobby of their building today for the ceremonial unveiling of Washington's most-controversial locomotive bell. And so, over protests from a group of coal-state members of Congress, a red-velvet shroud was removed and the bell revealed in its brassy, controversial glory.—Russell Baker, in *The New York Times.*

Reporter Baker could have added that members of Congress had company in their protests, and perhaps he also could have reported that some coal men saw this as another piece of evidence confirming their suspicions that neither the ICC nor the railroads—or at least a fair number of them—are thinking too seriously about helping coal contribute more traffic. But to get back to the steam locomotive, there are a lot of them left and they probably never will pass out of the picture, even though the last of the major railroads to remain on steam—the Norfolk & Western—has at last broken down and ordered some diesels. And when it comes to coal as a fuel, the coal-fired turbine still is to be heard from.

Suggestion to the ICC, and to the officials of the St. Louis-San Francisco, which furnished the bell. Better save a date for another ceremony. You might be needing it to unveil a cylinder head marking the passing of the diesel—and not too far in the future either.

Off The Job

With considerable ground still to be gained on the job, it might seem like piling Pelion on Ossa to ask coal to actively campaign for safety off the job. Still there are some good reasons why the idea is sound. True, an accident off the jobs means that the company is not liable for compensation and medical payments. But there is an effect, nevertheless, as any mining man who has had to operate with short crews or hire and train a replacement for a key man knows. And on top of everything, there is the satisfaction that flows out of saving a life or preventing an injury, whether on or off the job. It's an idea worth thinking about, and the "Off-the-Job Safety Committee" of the National Safety Council stands ready to help.

Bolting Plus

Those companies that publish magazines and newspapers for employees will be interested to know that they have company in other lands. An example is *The Coal Miner,* published by the N. S. W. Combined Colliery Proprietors' Association, of Australia. It marked its 5th birthday with the March, 1955, issue. Among the items listed on the cover of the first issue, incidentally, was "Mr. Coal of the U. S. A." The March, 1955, or "Special Coal Industry Development Issue," includes a discussion of roof-bolting benefits. This one was offered by Bruce McKensey, superintendent of collieries, Hebburn, Ltd.:

"The use of bolts, it is hoped, will cause the top high-sulphur unsalable coal to fall in large blocks [in pillar recovery] rather than in finely granulated particles, thus taking in less oxygen and reducing the possibility of heating."

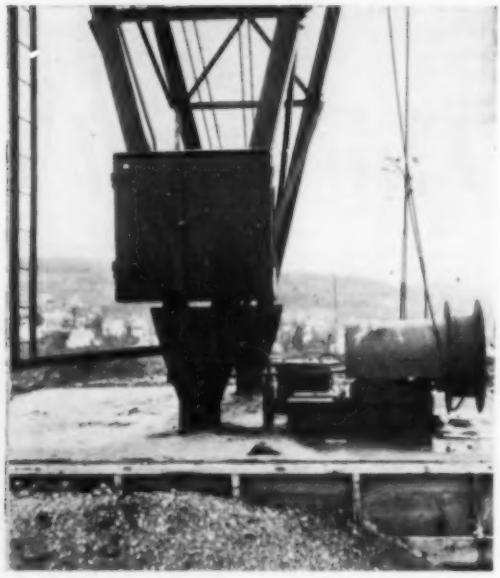
Cranial Payoff

If anything really new in pillar mining comes out in the next few years it undoubtedly will reflect the advent of the continuous miner. Already, the miner—and the auxiliary units being developed to enable it to produce with maximum efficiency—are having their influence on pillaring plans. An example, for which the officials well merit a bow, is the one developed to make use of the special features of the extensible belt at the Compass Coal Co. mine, in northern West Virginia. For the details, see the article on p 50-55 of this issue. The Compass approach is the sound approach to the question of getting the most out of a new machine, which is: study the unit and then develop the best-possible methods of making use of its characteristics. This process undoubtedly will bring out other useful and valuable pillaring systems as the number of new units in service increases. The brain sweat involved (see p 82 for hints as to how this process also can be made more efficient) will, as past examples prove to the hilt, really pay off.

Still Just Talk

The list of fields in which the atom is to compete with coal—and other fuels—was extended to home heating June 8 by an official of the Institute of Boiler & Radiator Manufacturers. With this new nomination, the atom now has been put up as a contender in practically every field of coal use except cement-burning and smelting iron ore. And maybe they are next. The fact is, however, that except for the Duquesne Light plant now under construction, all these prognostications are still only talk. **Even if these applications for the atom should eventually prove competitive, which is no certainty, the prospects are that coal will continue to supply energy for the atomic program on a considerable scale for some time to come, rather than lose business to it.**

CONCRETE TUNNEL saved the cost of building a high-capacity refuse bin. Tripper releases slate from tram bucket.



CABLE REEL salvaged from shuttle car simplifies lowering of tripper for inspection.

TRIPPER DEVICE 20 ft ahead of slate bucket was devised to release rock over center of tunnel and take full advantage of storage area.

CHIEF ELECTRICIAN, Simon Harshman, designed tripper device.

5 Steps to Better Slate Handling

NEW IDEAS to increase efficiency and cut maintenance costs have resulted in a smooth refuse-handling system at the Clyde mine of the Republic Steel Corp., Fredericktown, Pa. Included among the ideas are:

1. A new tripper device for the aerial tram bucket.

2. A concrete tunnel that saved the cost of a large slate bin.

3. Direct communication between hoist operator and men at the dumping point.

4. A luminous-painted tramway bucket to aid visibility at night.

5. A special hoist for lowering the tripper when it requires maintenance.

A combination of events led to the application of the new ideas in the fall of 1953. For years, slate had been carried away from the preparation plant by an aerial tram that released it on top of a refuse pile about 1,100 ft away from the plant. To keep the refuse pile from blocking the tramway bucket a bulldozer was used to push rock away from the dumping point. This method of spreading was satisfactory until 1952 when the dozer

began having difficulty moving material over an increasingly longer distance. As a result, management decided that new facilities such as a bin and haulage units would be needed to provide a satisfactory disposal method.

The concrete tunnel was built on top of the leveled slate dump at the point selected for future dumping and three overhead power-operated slate gates were incorporated in it to provide fast, easy loading of haulage units. After the tunnel was completed, the aerial-tram tower and tripper were relocated so that dumping would be over the tunnel midpoint. Results of calculations indicated that 1,000 tons of refuse could be stored in the area without blocking the tunnel entrances.

Two 18-ton units purchased for the hauling job work two shifts per day while handling 1,700 tons of refuse. The mine and preparation plant operate three shifts and third-shift refuse is dumped in the storage area for removal the next day.

Trucks alternately back into the tunnel to a position beneath one of the three power-operated gates where the driver loads his truck by pushing a button actuating the overhead gate. While one truck is being loaded, the second unit is hauling an 18-ton load 500 ft to the edge of the spoil area. The little time consumed making the short haul permits maximum productive effort from the trucks. Thus the two units handle the refuse with ease.

Soon after the new facilities were put to work, it became apparent that smooth operation depended greatly upon the accuracy of the dumping over the tunnel. Slate had to be dumped within a 20-ft distance to take full advantage of the storage area over the tunnel and the automatic tripping device had to function nearly perfectly to release it within the limit. The old automatic tripper was controlled by the number of revolutions made by the wheels of the 5-ton bucket, and any sliding or spinning of the wheels would change the dumping point. Consequently, refuse frequently was dumped outside of the 20-ft limit and the bucket sometimes struck the tripper car, causing damage to both. To provide the positive dumping necessary, a new tripper was designed and built by Simon Harshman, chief electrician at Clyde mine.

The new tripper consists of a lever and rope arrangement that releases the slate from the tram bucket before it comes in contact with the tripper. Mounted off center on the hoist rope about 20 ft ahead of the slate bucket, the lever strikes the tripper as the load of slate approaches the dumping point. As the lever is deflected it pulls a ½-in rope attached to the release mechanism on the bucket. Thus the slate is released at the proper time and independently of the revolutions made by the bucket wheels. If for any reason the lever device should fail to work, the slate bucket can be moved forward until it contacts the tripper, which will release the rock.

The tripper lever is pin-connected off-center to a clamp secured to the hoisting rope. A piece of ½-in rope leads from the shorter section of the lever to the release mechanism on the slate-bucket door.

An automatically controlled warning horn sounds in the hoist house when the slate bucket is 15 ft away from the tripper at the dumping point. This always reminds the hoist operator to reduce the hoist speed as the bucket approaches the dump and warns him to stop hoisting before the bucket hits the tripper. Operation of the horn is controlled by the number of turns of rope on the hoisting drum and thus the horn always sounds when the bucket is 15-ft from the tripper.

To provide good communication between the dumping point, hoist house and superintendent's office, Teletalk units have been installed at each location. The units are especially helpful to the hoist operator on the second and third shifts when he can't see the dumping point because of fog, rain or snow. By keeping the circuit open, he can hear slate leaving the bucket and can talk with truck drivers whenever necessary.

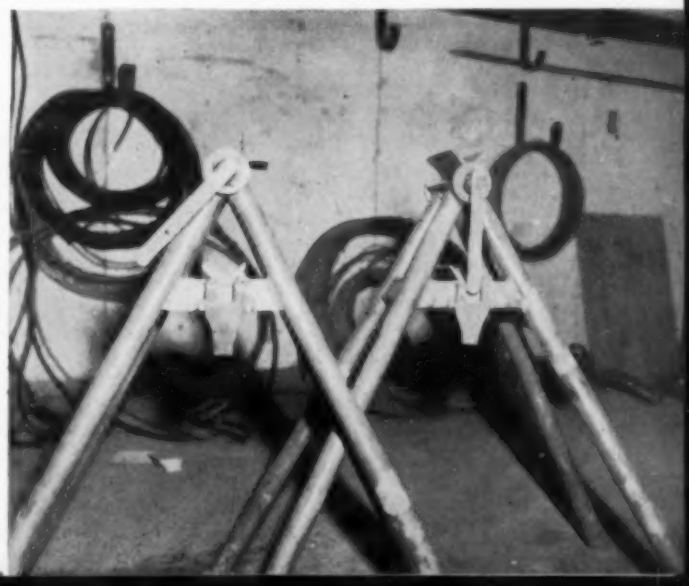
Powerful floodlights are located at the dumping and haulage areas and the slate bucket is painted with luminous paint to make refuse disposal at night nearly as easy as during the day. On clear nights, the luminous paint makes the bucket easy to follow as it travels between the preparation plant and dump.

Periodically it is necessary to lower the tripper for inspection and repair. Up to the time Simon Harshman and his crew installed an electrically-powered cable reel to do the job, a bulldozer or truck and a wire rope were required. Now, an old shuttle-car cable reel, powered by a 5-hp motor, is mounted permanently at the base of the aerial tram tower and used to handle the tripper. When the tripper is to be inspected, a loaded bucket of refuse is hoisted to a point where the distance between the refuse bank and the aerial-tram cables is a minimum. Then the cable reel at the aerial tower is used to lower the tripper to the slate bucket where maintenance men use a ladder to work on the tripper. In addition to handling the tripper car more smoothly, the cable reel has eliminated the need for having a truck or dozer available when the tripper is being serviced.

Self-Unloading Reel Stands Save Time and Labor

HANDLING HEAVY REELS, loaded with trailing cables from stripping units, is a recurring job at Shen-Penn Production Co., Shenandoah, Pa. That's why the crew in the electric shop took steps to simplify the work by building a set of stands from which reels could be dumped with a flick of the wrist.

In practice, a shaft is passed through the reel to be unloaded or loaded with cable and the reel then is jacked up until the ends of the shaft can be rested in the angle cradles on top of the stands. The reel then is free to turn. When the time comes to unload the reel, it is unnecessary to repeat the jacking process, because the angle cradles can be rotated through the action of a simple locking lever, as illustrated, thus dropping the reel off the stands.



IMPROVED preparation and more efficient mining methods are key factors that permitted a smooth transition from a railroad-fuel mine to a supplier of special products.

RATCHET SAWBILLS teamed with shaker conveyors are employed in 30-ft rooms to load 9-ft cuts of coal.

SAFETY TIMBERS are set ahead of aluminum bars before coal is shot. More are set as coal is removed.

How Kramer Mine

Faced with loss of its only customer, Northwestern Mining & Exchange buckled down to develop completely different markets and revise its operating methods to permit effective competition. Progressive management, intensified production planning, careful control of coal quality at the face and consistent safety promotion are among the factors behind this efficient conveyor operation producing 2,000 tpd from a 33-in seam.

WHAT HAPPENS when a coal company loses its only customer? The usual answer is: "Go out of business." But not so for the Northwestern Mining & Exchange Co., Stump Creek, Pa. True, sails had to be trimmed and belts tightened but 4 yr after losing its sole customer, Northwestern Mining & Exchange is producing at its Kramer Mine, 2,000 tpd for an entirely new group of customers. This is the story of how new markets were created, how mining and safety were improved and how coal is prepared for the new markets.

Northwestern Mining is headed by J. A. Martin, president, who has offices in Scranton, Pa. Carl A. Peterson, vice president and general manager, in charge of operations, has headquarters at Stump Creek, Pa. Other members of the mining management team include W. Mowrey, superintendent; G. Pudlo, mine foreman; G. Lundberg, mine electrician; O. London, outside foreman; J. Whammond, power and mechanical consultant; D. M. Doughman, chief engineer; E. I. Haag, mining engineer; M. Holsopple, safety engineer; W. R. Clark, purchasing agent; and J. D. Gallagher, resident auditor.

GETTING NEW MARKETS

Up to 1951, Northwestern Mining's entire output was sold for locomotive fuel. But when the railroad converted to diesels, Northwestern management faced the problem of developing new markets or closing the mines. Management felt a keen responsibility to exert every effort to find new markets to preserve the jobs of its employees, many of whom had long service with the company, and some of whom had never worked for any other employer.

Operating management sent an urgent appeal to the sales organization to get any business possible and particularly to concentrate on business with special requirements that made it unattractive to coal producers already established in the commercial market. At the same time, mine management went over the preparation plant with a fine tooth comb to determine ways of reducing degradation, since it was known that new customers would require a differently prepared and sized product than needed for locomotive fuel. To compete for customers with special fuel requirements, management also knew that such customers would have to be supplied a higher quality product than was hitherto available to them.

Adapted to Changing Markets

To improve quality, management had the choice of either making a major capital expenditure for cleaning facilities or going all out in a campaign to improve face preparation to get the desired results. Management chose the latter for several reasons: (1) seam conditions were such that cleaning at the face was practicable; (2) management felt that coal analysis could be improved by better face preparation to yield a product with 1% sulphur and 7½% ash; and (3) success in the new market was not a sure thing since the company had to develop new customers, and therefore the risk in new capital expenditures was greater than normal.

United Eastern Coal Sales Corp. is Northwestern's exclusive sales agent. The United Eastern sales and service personnel were successful in getting new customers and mine management moved forward in gearing mining and preparation methods to meet the customers' needs. However, as a result of going into new markets when they did, Northwestern found themselves with a group of customers who had very special requirements. This placed a heavy responsibility on all operating men to produce coal to meet the exacting standards.

CONTROLLING QUALITY

Some of the products required by Northwestern's customers include double-screened nut coal; five different sizes of coarse slack; special fine slack for powdered fuel; and nut and slack with any desired quantity of slack removed.

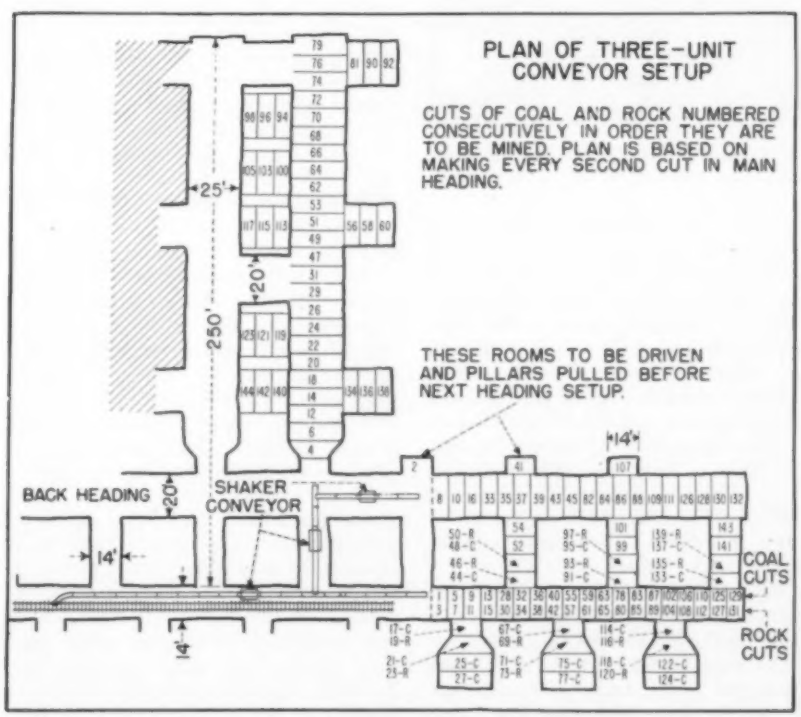
To maintain close control over quality, Northwestern has set up a detailed system of records. For example, a special chart has been made with each customer's name and his special requirements. A copy of this information is kept at the tipple and as each car is loaded, it is checked to see that it meets the customer requirements shown on the chart.

Other important information is recorded daily as coal is loaded. A record is made of each trip of coal going to the tipple and the time it was processed. Thus it is possible to determine from which section each railroad car of coal was produced. If there are any customer complaints, the company has sufficient information to determine the cause and take appropriate corrective measures.

A man inspects each railroad car for sizing and impurities as it is loaded. Regular proximate analyses and screen tests also are made for all sizes. Each car of stoker coal is subjected to a special test. If any impurity is found, it is weighed and this weight is used as an index for quality control.

Since production of coarse slack is of vital importance to customers, rigid control is maintained over the quantity of powder used in breaking coal. Each day a record is made on a master sheet of the sticks of coal powder and rock powder and blasting caps used. This information is recorded semimonthly for each conveyor crew and broken down into development and room work. Results are transferred to a cumulative sheet from which section results can be followed for a year or more if desired.

Although considerable detail work is entailed in keeping the explosives record, management reports that the percentage of fines has decreased substantially since the system was started. Over-all yield from explosives in room and development work has improved from 1.35 tons per stick to 1.75. In room work alone, tons per stick increased from 1.48 to 1.92. This improvement in yield per lb of explosives has been an important factor in producing the coarse type of slack that Northwestern's customers desire.


PLAN OF THREE-UNIT CONVEYOR SETUP
CUTS OF COAL AND ROCK NUMBERED CONSECUTIVELY IN ORDER THEY ARE TO BE MINED. PLAN IS BASED ON MAKING EVERY SECOND CUT IN MAIN HEADING.
THESE ROOMS TO BE DRIVEN AND PILLARS PULLED BEFORE NEXT HEADING SETUP.
25'
20'
250'
14'
BACK HEADING
20'
SHAKER CONVEYOR
14'
4'
COAL CUTS
ROCK CUTS

MINING PLAN for developing room entry with three conveyors includes details of mining for two-shift operation. Rock is loaded every second cut.

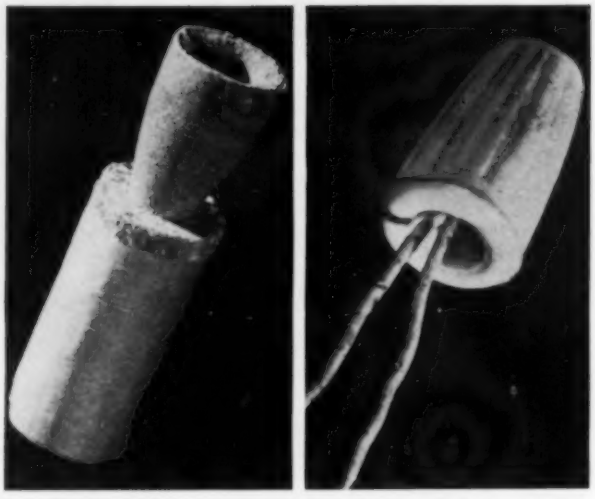
PLANNING PRODUCTION

Aside from the problem of preparing a number of special sizes, Northwestern must get all of its production from the Lower Freeport bed, the average thickness of which is only 33 in. Kramer's output is produced with conveyors and a large area must be mined to yield the 2,000-tpd output. Keeping production flowing uniformly is achieved by close cooperation between engineering and operating personnel, who participate in regular conferences.

Periodically, engineers gather data on mining conditions in each section of the mine and record them on an analysis sheet along with the present tons per man-shift for each unit. By consulting maps and applying the data, a production forecast is made for each mining area, including the remaining number of work days in each. Then new locations are selected for each unit and the life of each new area is estimated.

Information is then posted on a projection sheet which shows tons per conveyor by 2-wk periods for 2 yr. Development work is shown in red and room work in blue. Thus the relation between development and room units can be seen at a glance. The production schedule for the 2-yr pe-

GALVANOMETER is used by shotfirer to test blasting circuit before multiple blast is set off.



TAMPING PLUGS and ceramic insulators are used for better and safer blasting at Kramer.

SPECIAL PRODUCTS are loaded at the Kramer mine to meet customers' special needs. Shuttle belt over cars permits two types of slack to be loaded.

riod also is shown on a forecasting map.

Every 3 mo, a conference is held to review the production schedule and revise it if mining conditions change. Key officials participating in the meetings are the mining engineer, mine superintendent, mine foreman, safety inspector and assistant mine foremen. These men analyze the production forecast and make plans for future mining. The production forecast has been found to be an extremely valuable tool in keeping a good balance between development and room work. If for some reason production is not progressing according to schedule, equipment moves can be rescheduled to prevent imbalance between room and development production.

MINING THE COAL

Main entries are developed with six headings on 52-ft centers, three being intake headings and the other three return headings. Rock is brushed in one intake heading to provide clearance for haulage equipment. The haulage heading is driven 14 ft wide and the other 18 ft wide.

Room entries are turned 90 deg with the mains and are developed with two headings on 52-ft centers. Rooms, on 55-ft centers, are driven 240 ft deep off both sides of the entry and pillars are recovered. One side of the entry is mined on the advance and the other on retreat.

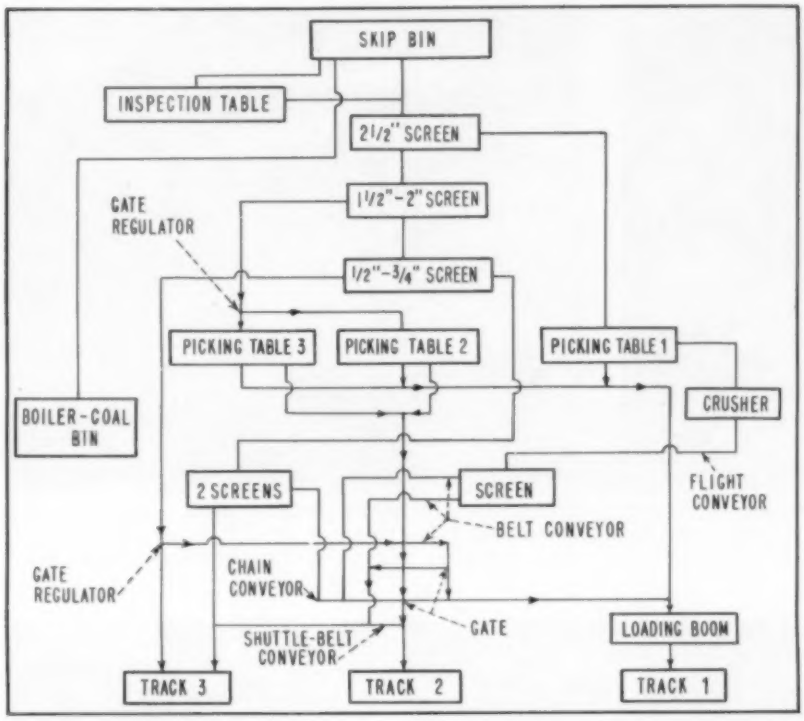
Coal is undercut to a depth of 9 ft with shortwall machines, including Jeffrey 35B, 35L, 35BB and bug-duster-equipped Goodman 512 units equipped with Tracy chains. Coal drilling is done with Chicago Pneumatic 572 handheld units while C-P 574 post-mounted drills are used in rock work. Coal and rock drills are equipped with 2-, 4-, 6- and 8-ft auger sections and cemented-carbide bits.

All coal and rock is delivered from the face to mine cars by LaDel, Goodman and Herold shaker units. Goodman duckbills are employed for rock loading in entries and ratchet sawbills are used in room work. The ratchet device used for feeding the sawbill into the cut and blasted coal was developed and perfected by Kramer mine personnel. It is now manufactured by and marketed by Goodman Mfg. Co. Mine cars are handled at the loading point by Brown-Fayro hoists. Jeffrey 8-ton locomotives transfer cars from the loading points to the sidetracks where they are picked up by 13-ton units for delivery to the shaft bottom.

IMPROVING BLASTING METHODS

To reduce human effort, increase safety and improve output per man-shift, a number of improvements have been made in blasting techniques at Kramer mine. The most recent has been the application of multiple blasting and millisecond delays. This has been done only with the approval of the Pennsylvania Department of Mines, which, after investigation, granted permission to use multiple blasting.

For some time, Carl Peterson, vice president and general manager, had advocated as a safety measure the adoption of multiple blasting in bituminous coal mines of Pennsylvania. He discussed the matter with the state and federal mine inspectors to develop ideas as to how the multiple-blasting technique might be used. By combining the inspectors' ideas with the ideas of Northwestern officials a



HOW THE KRAMER CLEANING PLANT is designed to prepare a variety of sizes to meet the special needs of Northwestern's customers.

proposed method for multiple blasting was developed.

However, before the system could be put in use, permission had to be obtained from the Pennsylvania Department of Mines. In a letter to W. J. Clements, the then Secretary, state Department of Mines, the details of the proposed multiple-blasting technique and the advantages were set forth. In addition to emphasizing the safety advantages of multiple blasting, human and economic considerations in working thin coal were emphasized. With single-shot blasting it was necessary for a man to crawl on hands and knees as much as 1,000 ft to blast a cut requiring four shots. With multiple blasting, the shotfirer would be required to crawl only 25% as far.

It also was stressed that the time and energy saved and the good will created among the workers would, when turned into productive work, be a significant factor in making it possible for the mine to continue to operate profitably. After further correspondence and a series of conferences in Harrisburg with the Department of Mines, permission was granted to use the proposed multiple blasting method at Kramer.

Here is what the multiple blasting method involves:

1. Firing four shots at a time, using an approved blasting unit with at least at 10-shot capacity built into it.

2. Providing each shotfirer with a galvanometer and making it mandatory to test the circuit with it for short or open circuits before attempting to set off the charge.

3. Requiring all connections in damp places or near pipe lines or equipment to be tightened and insulated with screw-on ceramic insulators.

4. Establishing and enforcing a special set of rules governing multiple blasting.

5. Requiring each employee who is to do blasting to study the rules and pass an examination. Further, each is given underground instruction and is required to demonstrate his ability to blast properly to the company instructor before being permitted to do multiple blasting. Instructions are given only to those who have passed the state examination for shotfirer.

6. Periodic inspection of each working place while blasting is being done to check on whether safe procedure as set forth in the rules is being followed in detail.

To further reduce the human effort involved in breaking coal, Perma-Seal tamping plugs are used in place of conventional stemming material. One plug is used per hole and is inserted in a matter of seconds. Management points out that considerable time is saved since men do not have to make stemming material by hand and the holes do not have to be filled completely as with conventional material.

SUPPORTING THE ROOF

To prevent accidents resulting from roof falls at the face, a rigid timbering standard is maintained at Kramer mine. Minimum timbering standards include wood posts set on 4-ft centers and in the face area, 4-in aluminum H-beams set on screw jacks together with safety posts. Protection in the working area is provided by a minimum of two aluminum H-beams plus three safety posts set as close to the face as possible. If the roof is weaker than normal, additional supports are set. As coal is loaded out from right to left, additional safety timbers are set between the row of safety timbers and the solid face.

After the cut is loaded, wood posts are set near the outby aluminum bar, which is then taken down and reset ahead of the other one. The cutting crew then is permitted to cut the place.

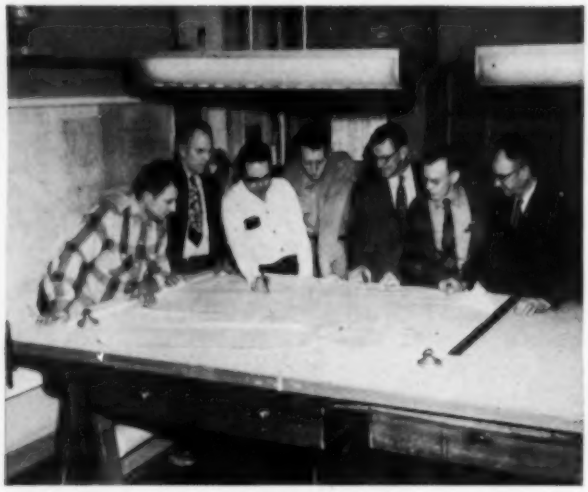
After top is brushed in haulage roads, roof is supported by 5x7-in by 12-ft wood crossbars supported by wood legs. Sometimes the bars have been supported by metal saddles fitted into holes bored into the ribs.

In connection with the prevention of roof-fall accidents, special attention is paid to testing and examining roof in the working places. About 8 yr ago investigation by State Mine Inspector A. J. Nairn revealed that roof testing at the mine was unsatisfactory because it was done with make-shift devices such as pick handles. In co-operation with Mr. Nairn, a 1¼x18-in round steel testing bar, reserved solely for roof testing, was introduced. The bar has a hole drilled in one end so that a loop of wire can be put through for hanging it on a post near the face. Mr. Nairn demonstrated the superiority of the steel testing bar over other devices to the officials and mine workers in his inspections. As a result, the steel roof-testing bar has been used ever since. The mine inspector and mine management feel that the improved knowledge of roof conditions resulting from better roof testing, along with systematic timbering and strict enforcement of safety rules, has undoubtedly played a large role in prevention of roof-fall accidents.

HOW MINING IS DONE

Each shaker conveyor is manned by a four-man crew. Three men handle the face duties of cutting, shooting, loading and timbering while the fourth man works at the car-loading point. Normal output per crew in heading development is three cuts per shift and includes one or two cuts of rock.

VENTILATION CONFERENCE includes W. M. Mowrey (left), superintendent; M. Holsopple, safety inspector; G. Pudlo, mine foreman; and E. I. Haag, mining engineer.



PRODUCTION CONFERENCES include engineering and production officials who meet every 3 mo to review production schedules and forecasts and make adjustments.

SAFETY AND PRODUCTION are discussed by D. M. Doughman (left), J. Piszker, J. Polifko, J. Murone, W. Lowrey, C. A. Peterson, G. Pudlo, M. Holsopple, E. Haag and C. Gilnett. Vice President Carl A. Peterson (right photo) sparked 100% safety training.

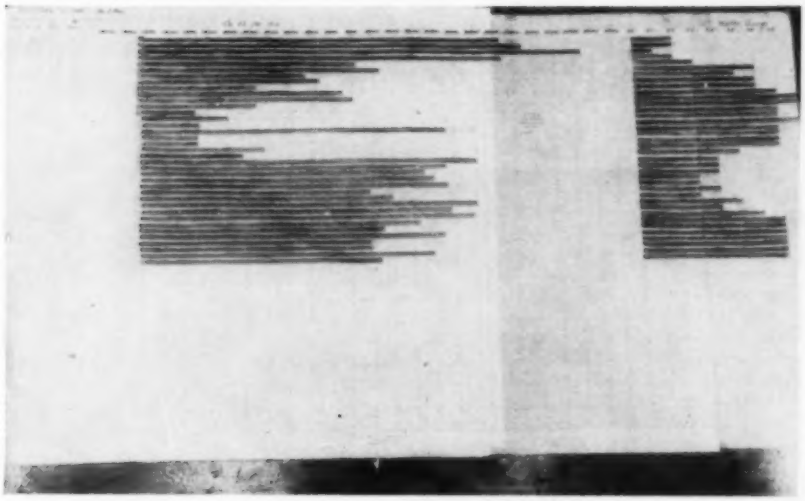
Supervision Keyed to Safer, More Productive Operation

"The supervisory setup at the Kramer mine provides for from three to four supervisor visits to each working place daily, as well as frequent visits by the general mine foremen and company inspections of safety, equipment maintenance, mining methods and recovery. Under the equipment-maintenance program a weekly inspection for permissibility is made of all permissible equipment.

"The supervisory force consists of a general mine foreman, four assistant foremen, six firebosses and six conveyor bosses. The conveyor bosses serve as trouble shooters, expeditors and servicemen. They have charge of conveyor moving and are qualified to fill in for the assistant foremen when necessary.

"The supervisory plan calls for the first supervisor visit to a working place each day to be made within the first hour or half hour of the shift by either the assistant foreman, a conveyor boss or a fireboss. A special report is made by supervisors of these first visits to show the condition of the working place as left by the previous shift. On this first visit the supervisor also makes a check of safety and operating conditions. If anything is needed for either safety or operations it is his job to take steps to provide it immediately.

"This system of a first visit to each working place within the first hour or half hour of the shift has resulted in settling complaints which used to be very common about lack of co-operation between day shift and night shift. It has also brought greater safety and more productive operation."



BAR GRAPHS maintained for each split show graphically the air flow recorded in bi-weekly inspections. Management has found graphs very useful in studying ventilation history and conditions in each split.

Rock is taken immediately after the coal is removed. Thus if the first-shift crew starts the day loading coal, it next loads rock and completes the shift by loading coal. The second shift then would load the rock left by the day shift. A cut of coal then is loaded and the shift is completed by loading rock. In back headings, where top is not brushed, each crew normally produces three cuts of coal.

In room work, crews use ratchet sawbills and shaker conveyors to produce as many as 3½ cuts of coal per shift with a crew of four men. That figures out to 94 tons maximum production per four-man crew. An average 240-ft room is driven up and the pillar extracted, and equipment moved to new location in 9 days.

HANDLING MINE WATER

The Lower Freeport at Kramer mine lies in a basin which is under 300 to 450 ft of cover and dips to the southwest. To handle the water from advancing work and worked-out areas, Kramer has three large underground pumping stations plus numerous gathering pumps. Gravity drainage is used wherever possible to keep pumping costs as low as possible. All gathering pumps deliver water to where it will flow by gravity to the main pumps. All pumping is done with off-peak power except that required to serve dust control at the rotary dump.

The main-entry pump room includes 500- and 2,000-gpm Scranton centrifugal units powered by 440-v 75- and 250-hp General Electric motors. The 2,000-gpm unit is equipped with automatic controls but usually operates only with automatic stopping.

In the 21 West pump room, water is handled by an automatically controlled 3,800-gpm Goyne centrifugal pump, powered by a 2,300-v 400-hp Westinghouse motor. Included in the third pump room in 18 Southwest are a 1,000-gpm Scranton unit powered by a 150-hp General Electric motor and an automatically controlled 3,300-gpm Goyne pump driven by a 2,300-v 400-hp Westinghouse motor. Water from all three pumping stations is discharged to the surface through boreholes cased with 8- and 12-in pipe.

All mine pumps are equipped with Servis-Recorder timing devices which record on a chart the starting, stopping and running time of each pump. The charts also have many other uses. They are used by the engineering department to make accurate computations of the quantity of water pumped and power consumed for pumping. This information has proved valuable in studying pumping requirements and improving pumping efficiency. The charts also enabled the engineering department to police pumping and see that it is done only on the off-peak load periods. When an adjoining mine was abandoned 1½ yr ago, the Servis-Recorder charts provided accurate information that enabled the engineering department to check the effectiveness of the barrier pillar between the two mines. It was possible to make an accurate calculation of the quantity of water pumped before and after the adjoining mine was permitted to fill with water.

VENTILATING THE MINE

Air for ventilating Kramer mine is supplied by a Jeffrey 8-ft Aerodyne and a 5x12 centrifugal fans. Both fans operate exhausting while delivering air to 23 splits. The centrifugal unit handles 270,000 cfm and the Aerodyne 200,000 cfm. Stoppings in main entries are constructed with concrete blocks while those in room entries are built of hollow tile.

Because large areas of coal are removed to maintain the Kramer output and because the mine liberates methane, very close control is maintained over ventilation. A continuous inspection of ventilating and rock-dusting is made by a ventilation inspector. He travels the mine with a methane detector, taking samples in all splits, main returns and gob areas. This usually is done over a 2-wk period in conjunction with his rock-dust inspection duties.

Samples of rock-dusted areas are taken regularly and analyses are made to determine the per cent of incombustible. Results of the analyses are given to the mine foreman and superintendent and are recorded on a special rock-dust analysis map by the engineering department.

In addition to the legally required weekly ventilation measurements, bi-weekly reports are made on the ventilation condition in each split, main returns, intakes, gob areas and bleeders. Included in the report are the following data for each of the locations: volume of air; per cent of methane; quantity of methane liberated in 24 hr; increase or decrease in methane liberated; date, barometer and water gage.

The engineering department keeps for each split a separate cumulative ventilation chart on which is shown the data reported in the bi-weekly ventilation report, plus a bar graph of the quantity of air flowing in the split. Management reports that the bar graphs are very useful in getting a quick picture of the ventilation history and condition in each split.

Every 2 wk, after ventilation reports are completed, a ventilation conference is held to review the ventilation conditions in all areas of the mine. Participants in the conference include the mining engineer, superintendent, mine foreman and safety inspector. Ventilation reports and charts are studied carefully and methods of improving the ventilation are developed if necessary.

POWERING THE MINE

Energy is delivered to the mine at 33,000 v by the Pennsylvania Electric Co. and stepped down to 2,300 v by four General Electric 2,000-kva transformers. Power is carried from the transformer stations to surface substations supplying DC power for min-

ing equipment. Substations are housed in Truscon and Blaw Knox 20x24-ft prefabricated steel buildings.

Each surface substation supplies power to all mining equipment within a 1-mi radius. As mining moves to a different area and equipment approaches the 1-mi limit, new boreholes are drilled to intersect mine workings and substations are relocated. Direct current is delivered under ground by 1-million-cir mil feeders.

REWARD FOR ACHIEVEMENT includes 100% training certificates presented to mine local by UMWA and USBM. Participating are John Ghizzoni (left), president, District 2, UMWA; John Cowan Jr., president, Local 99, UMWA; C. Ferguson, safety director, UMWA, Washington, D. C.; J. J. Forbes, director, USBM; and S. Allessi, vice president, Local 99, UMWA.

How 100% Training Was Organized And Its Results in Improving Safety

Sparked by an article on safety training in the December, 1953, issue of *Coal Age*, Northwestern Mining & Exchange Co. became the first coal mine in Pennsylvania to complete with 100% employee participation the USBM safety training course. Carl Peterson, vice president and general manager, was impressed with the results reported in the *Coal Age* article and, as a result, sent for reprints for distribution to key employees.

"Our 100% safety training came about as a result of an article in *Coal Age*. I was greatly impressed with the results achieved at the mines described in the article, and I thought our company could benefit from such a program." That's the way he summed up how 100% training got under way at his company.

Shortly after reading the article in *Coal Age*, Mr. Peterson suggested in a meeting with officials of the UMWA that 100% training would be a good thing for Northwest. The idea appealed to the union officials and all agreed that the matter should be discussed in detail at a luncheon meeting on Jan. 16, 1954. Invitations, signed by Mr. Peterson and John Cowan Jr., president, Local 99, UMWA, were sent to company and union officials as well as to state and federal district mine inspectors.

Key speaker at the luncheon was J. B. Yanity, of the USBM, who described the 100% safety training that had been carried out in Virginia and Kentucky. Co-chairmen were Messrs. Peterson and Cowan.

The need for 100% co-operation and enrollment in the course was stressed by Mr. Yanity as a prerequisite to achieving maximum benefits from the training program. He insisted that supervisors and workmen take the instruction together, sitting side by side in class. He also emphasized that of the 24 mines that had participated 100% in the safety course, all had shown a marked decrease in accidents. The upshot was agreement that the training program should be started as quickly as possible. However, Yanity's schedule was filled for the following weeks and it appeared that the safety training program would be delayed.

With enthusiasm at a high pitch, Mr. Peterson and Mr. Cowan were anxious to get the training started as quickly as possible. They phoned a personal plea to J. J. Forbes, director, USBM, promising to have the training completed within 2 wk if Mr. Yanity's schedule could be revised to permit him to come to Northwestern Jan. 25 to start the course. Mr. Forbes agreed and plans were made to contact all employees as quickly as possible. W. C. Cagley, of the USBM was assigned to help with the instruction.

Between Jan. 13 and 25, with union and company officials cooperating, all employees were contacted and urged to enroll in the course. During the same period, the company reconditioned an unused assembly hall at Kramer with seating facilities, lights and screens for projecting pictures used in the course.

By the time the first classes began on Monday, Jan. 25, all working employees were enrolled and attendance at the first class was 92.1%. Later it was 100%. To permit day and night employees to participate in the program, three classes were scheduled for each day, 12 noon, 3 pm and 6 pm. Enrollment in the noon group was 140; in the 3 pm class, 140; and in the 6 pm group, 100. Special provisions were made for training the sick and injured who could not participate in the regularly scheduled classes.

Training at Kramer was completed on Feb. 5, in what was reported to be a record time for the course. It also gave the Kramer group the honor of being the first bituminous mine in Pennsylvania to complete 100% training.

After completion of the training program, a safety rally was held at the local high school in Sykesville. Attended by over 600 persons including employees' wives and families, the rally featured presentation of certificates to the local union by the USBM and UMWA in recognition of training and achievement. A USBM certificate also was presented to the company and individual certificates were awarded to all who had received the training.

To create further interest in safety, Northwestern awarded $20 prizes for the best essays on what safety procedures should be employed at Kramer mine. Winners were announced at the rally.

Principal speakers at the rally were J. J. Forbes, director, USBM; Charles Ferguson, sales director, UMWA; and John Ghizzoni, president, District 2, UMWA.

At the end of 1954 management examined the safety record to deter-

SAFETY RALLY held in local high school after completion of 100% safety training was attended by over 600.

FIRST-AID ROOM has facilities for treating all types of injuries. Mine-rescue equipment also is stored there.

Maintaining Active Interest Is a Continuing Objective

"A successful accident-prevention program requires that ways be found to maintain a constant interest and effort on the part of management, supervisors and workmen," N M & E management points out. "At Kramer we stress friendly competition with other mines in the Holmes Safety Council, as well as friendly competition between supervisors to excel other supervisors at the mine and to better their previous records. Attractive merchandise awards for supervisors who have attained 100,000 man-hours without an accident has also brought the supervisors' wives and families into the accident-prevention competition as interested parties.

"It is well known that attention to safety always improves after a bad accident occurs at a mine. However, the man-hours of exposure in any single mine or company is not sufficient to provide the necessary stimulus needed from this source to prevent accident-prevention efforts from going stale. Therefore, in addition to studying and discussing the accidents at our own mine, we endeavor to keep supervisors and workmen on the alert by discussing and studying current accidents at other mines at our safety meetings. The fatal accidents reported each month in the Pennsylvania Department of Mines 'Safety Sentinel' are required reading for all supervisors and these accidents are also discussed at our safety meetings. We also post newspaper clippings about accidents at neighboring mines on our bulletin boards.

"This attention to current accidents in neighboring mines and current fatalities on a state-wide basis provides a continuous 'refresher course' in accident prevention for our supervisors and workmen. There is also a psychological 'shock' value and 'alertness and awareness' effect of publicizing accidents, especially those which occur at nearby mines and at our own mine, in maintaining safety consciousness and accident-prevention efforts.

"One of the causes of an accident-prevention program going stale is dependence on repetition of the same old generalities month after month. Discussion of actual accidents avoids generalities, and there is always enough difference in circumstances surrounding actual accidents to counteract the soporific effects of repeating the same thing too often."

mine how effective the training had been in reducing accidents. Here is what it learned: In 1954 Kramer had a severity rate of 0.99, which was the lowest ever achieved at the mine and represented an improvement of 50% over the previous record. A marked improvement in the frequency rate was also shown.

In commenting on the 100% participation in the safety training classes and the subsequent improvement in the accident record, Mr. Peterson said, "There is no question but what Joe Yanity's handling of the classes brought out the best in everyone who attended and made them safer supervisors and workers, but equally important is the high type of supervisors and workmen at the mine, together with the way the local and district union officials worked to sell the 100% training idea to their membership."

To keep all employees safety conscious, a one-day refresher course was given at the mine by the USBM. Safety principles were reviewed and men were encouraged to ask questions regarding safety practices. They also were urged to continue practicing the safety precautions that had been preached in the course.

Northwestern sponsors first-aid and mine rescue teams and enters first aid teams in annual competition. In 1952 and 1954, the Kramer first-aid team was champion in the 12th Bituminous District. Mine-rescue equipment at the mine includes two MSA Chemox breathing apparatus, six all-service gas masks, one H-H inhalator, 10 self-contained oxygen breathing apparatus, 12 self-rescuers and a carbon-monoxide detector.

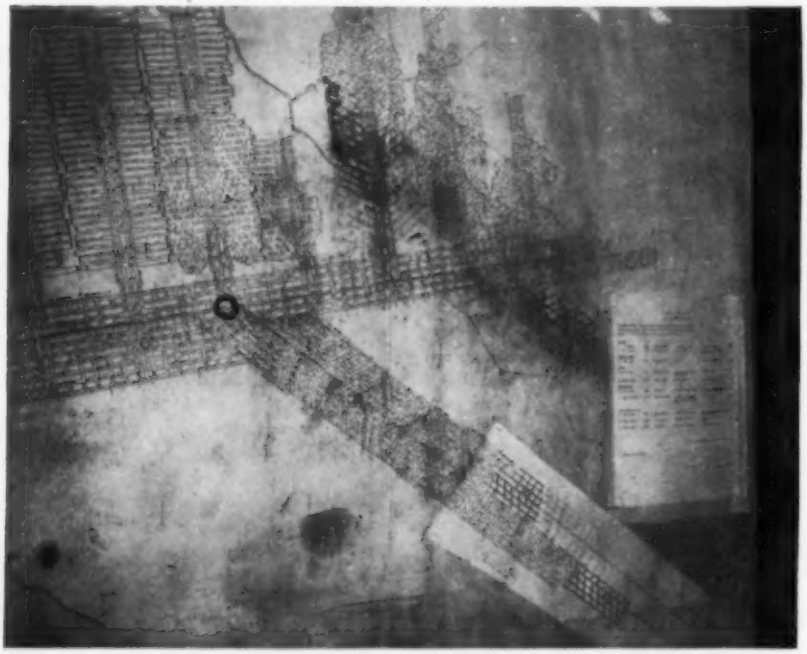
First-aid equipment is kept at various locations underground to permit injured workers to be treated quickly and made comfortable. On the surface, a fully equipped first-aid room is maintained with facilities and equipment for treatment of injuries.

AIR SHOOTING is simple and fast. Shotfirer takes only a few seconds to renew shear pin and requires no tools.

SHELL then is inserted in hole. Left rib shows angle at which 7½-ft holes are drilled in Wyoming mine.

Low-Cost Air Shooting

Red Jacket Coal Corp. demonstrates advantages of coal breaking by air in 30-in Sewell seam at Wyoming mine. Company-owned semi-portable compressors located at belt head serve faces up to 3,900 ft away.



FOUR SECTIONS in upper and lower right areas are supplied with air for coal breaking by the two compressors installed near the loading point (circle). Farthest face is 3,900 ft from the compressors.

AIR SHOOTING powered by semi-portable compressors has been used for 3 yr in the Wyoming mine of the Red Jacket Coal Corp., Wyoming, W. Va. As a result of their experience, company officials are highly pleased with the percentage of lump coal produced, and with the reliability, safety and over-all shooting cost obtained with the method.

Mining is in the 30-in Sewell seam which, in this district, yields a low-volatile product regarded as a premium smokeless coal in the domestic market. A high percentage of lump is a prime requisite of the operation.

Many years ago shooting was changed from permissible explosives to carbon-dioxide tubes and one section in the mine continues with that method. In 1952, the press for lower production cost and still more lump coal prompted management to install, on a trial basis, an Armstrong compressor, shells and auxiliary equipment made by the Armstrong Coalbreak Co., Benton Harbor, Mich., and handled by Liberty Powder Co., a branch of Olin Industries, Inc.

The company's successful experience, together with the opportunity to buy the equipment outright, led to the purchase of the first compressor, followed the second unit in 1953. Since then the Turkey Creek area of the mine, composed of four sections, has been shot exclusively with the Armstrong Coalbreaker.

In this area, entry headings are 20

SHOOTING VALVE needs only a half turn counter-clockwise to charge and fire shell; quarter turn clockwise to shut off air.

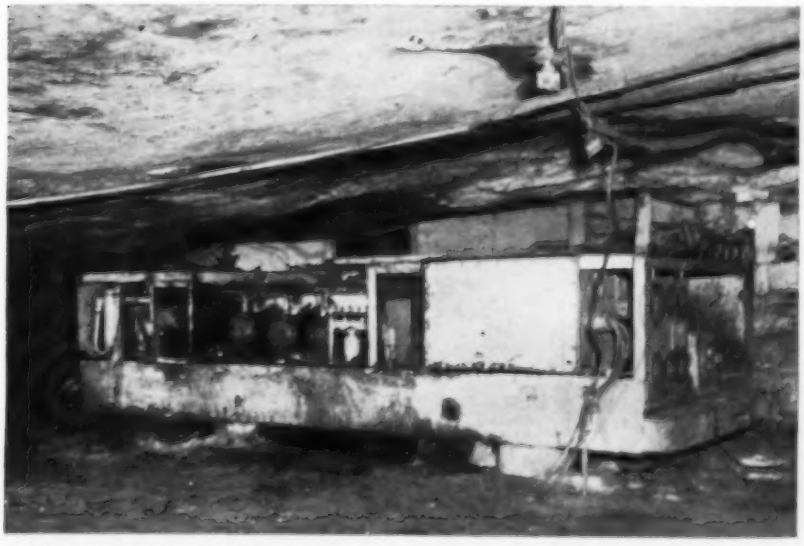
ft wide and rooms 26 ft on 50-ft centers. No pillars are taken. The coal is undercut to 7½ ft, on an average, with Jeffrey 35L machines, and is drilled with CP572 handheld electric drills. Joy 20-BU machines load into Joy 8-SC shuttle cars carrying 1½ tons. A Goodman section belt delivers to mine cars carrying 4.1 tons. No top is taken in room entries inby the loading point.

COMPRESSORS AT LOADING POINT

The two compressors are installed less than 100 ft apart in breakthroughs adjacent to the loading point and pump air into one line feeding the sections. They are Model EB-108B permissible units, each driven by a 50-hp 275-v DC motor. As now adjusted, the oldest, or No. 1, compressor kicks off at 10,000 psi and No. 2 unit at 10,200 psi. Both kick back on at 9,000 psi.

Performance of the compressors has been so satisfactory that interruptions have been few and of short duration. To date, neither unit has been out of the mine for a general overhaul. The No. 1 unit is scheduled for its first overhaul during the 1955 miners' vacation after over 3 yr service.

At the time this report was prepared, the farthest working faces were 3,900 ft from the compressors. The air is carried 3,400 ft in a steel line 1 in in outside diameter and ⅝ in in inside diameter, equipped with screw couplings in which the ends of the pipes butt against solid copper gaskets. The extended feed to a section consists of 300 ft of copper tubing, 0.377-in outside diameter, and 0.177-in inside diameter. The end of this tubing is attached to 200 ft of hose to reach the face.



THE TWO COMPRESSORS powering the system are driven by 50-hp 275-v DC permissible motors, and are mounted on track wheels. This unit, placed in a semi-permanent position across the track from a belt head, rests on wood skids.

NEW-TYPE HEAD USED

Shells used to break down the 7½-ft cuts have an outside diameter of 2 in, and are 9 ft 2 in long, including the head. The multiport head first used has the disadvantage that it must be taken apart every so often to remove the accumulation of slugs from the shear plates. For the most part, the original heads have been replaced by a shorter two-port head from which the spent slug blows out automatically.

Shear plates used are 1⅜ by 1⅜ in, 0.055 in thick, breaking at 7,000 to 8,000 psi. No tools are required to install the new plates after each shot. The shotfirer loosens the shooting cap by hand, drops a new shear plate into the slot and tightens the cap by hand.

The shooting valve is of an improved type with a hand wheel that is rotated by half a turn. After the shell erupts, the shotfirer closes off the air supply by a quarter turn counter-clockwise so that there need be very little loss of air. Another quarter turn in the same direction bleeds the inby hose or a charged shell.

Four holes are drilled for breaking down cuts in the 20-ft headings and five holes in the 26-ft rooms. Shear plates thicker than those now used were tried at the beginning. It was found, however, that thinner plates, rupturing at lower pressures, increased the lump without appreciably affecting loadability.

SHELL HANDLING SIMPLIFIED

Flying shells are a very rare occurrence. Usually, the shell moves out only a few feet and rests at the outby edge of the loose coal. There is no loss of shells and no daily handling and transportation of them in and out of the mine.

One man per section, carrying only a long-handled shovel, cleans out the undercuts and does the shooting. Total cost of shooting is less than 6c per ton of clean coal. Wyoming mine produces 1,200 tons (clean coal) per two-shift day. D. W. Halstead is superintendent at Wyoming. Other officials include Roy Short, general mine foreman; Fred Thomas, general night foreman; and C. L. Glover, resident engineer.

TWO BELT CONVEYORS in tandem handle main-slope haulage, with third unit (top right) in No. 1 Dunmore slope.

MAIN SLOPE at Rogers Bros. mine was driven through 250 ft of gravel and sand before hitting solid rock.

SHAKER with duckbill is used to load coal and bottom rock in belt heading in the No. 3 Dunmore.

ROTARY AIR DRILL and carbide bits permit two-man crew to handle drilling job with ease in hard anthracite.

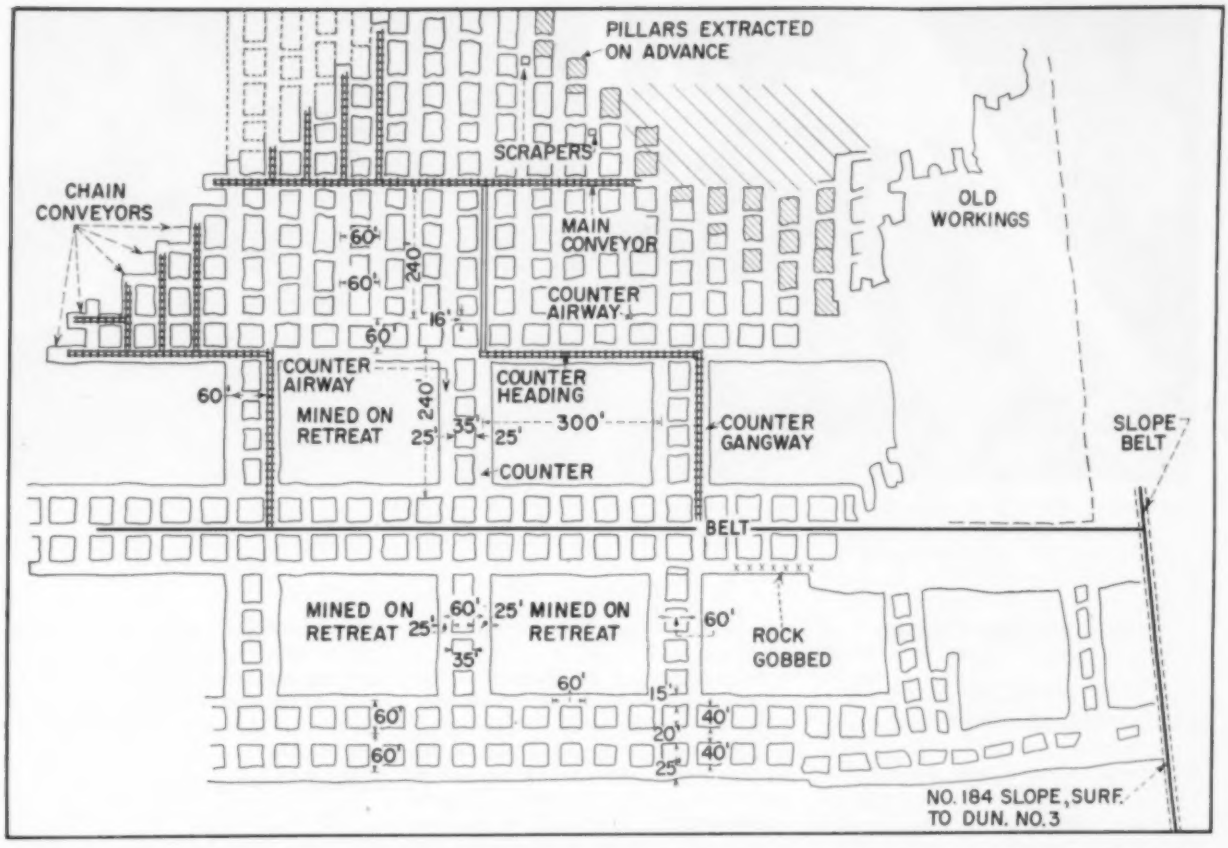
Belts + Concentrated Mining = Efficient Anthracite Operation

Rogers Bros. Coal Co. teams modern equipment and up-to-date mining plans for effective performance in moderately pitching seam.

EFFECTIVE MINING PLANS, all-conveyor transportation and cemented-carbide drill bits are big factors contributing to high output per man at the No. 184 slope mine of the Rogers Bros. Coal Co., Bell Mountain, Scranton, Pa. This all-conveyor anthracite operation uses chain conveyors in chambers and airways, scrapers in pillar recovery, shakers and duckbills in headings, and belts in panels and slopes.

Development of the slope operation is another milestone in the forward march of Joseph and Amos Rogers, founders and owners of the Rogers Bros. Coal Co. Walter Ketas is general manager; William Walters is general mine foreman; Thomas Hunter and George Gyle are master mechanics.

During a period of expansion and diversification of interests, the Rogers brothers did not let their coal-mining methods remain static. As early as 1944 they began mechanizing their



MINE LAYOUT at the Rogers Bros. Coal Co. features chain and belt conveyors in up-pitch and down-pitch anthracite mining. Work is concentrated and half of panel is extracted on advance with up-pitch methods.

mine with chain and belt conveyors. They believed that mining costs would have to be reduced considerably in the near future and that the only way to do it was to mechanize as much as possible.

Installation of conveyors to transport coal was followed by development of special cemented-carbide bits for improving coal drilling. Up to 1951, the company was using two-prong twist-type steel bits and hand-held electric drills. Three men were needed to handle the drilling assignment in the hard coal. A blacksmith also had to be employed full time to sharpen the drill bits and an electrician was employed full time to repair drill armatures burned up by overloading.

KEY MEN at Rogers Bros. Coal Co. operation include Walter Ketas, general manager (left), and Joseph A. Rogers, president.

DEVELOPING THE CARBIDE BIT

In 1951 Rogers Bros. began searching for a more serviceable and more efficient drill bit. The first efforts were toward developing a carbide-insert bit in the company shop by fastening Kennametal inserts to a company-designed bit. With this-type bit, the drilling job was made easier and only two men were required as compared to three when a steel bit was used.

Although the company-made bit made the drilling job easier, management was not satisfied with the cost of making them in the company shop. The next step was to try some conventional Kennametal bits. After exhaustive tests, management selected Kennametal RD 1⅝-in bits, A13 augers and BR-17 safety drive sockets.

Additional tests were conducted and it was found that RDC bits with a rake performed better than the RD type. Some RDC units without the rake were tried but the drillers complained that this type did not drill as effectively as the bit with the rake. Three men had difficulty performing the same drilling job that two men

TRANSFER PAN diverts rock from heading shaker to crosscut unit, saving rock handling on surface.

CHAIN CONVEYORS are used in up-pitch chambers, counters and airways to bring coal to belt.

DRILL BIT TIME STUDIES

Test 1—RDC 1⅝-In Bit With Modified Rake

Hole	Depth	Location	Time Min.	Time Sec.	Remarks
1	5 ft.	Bottom	0	59	2 men
2	7 ft.	Bottom	1	30	2 men
3	7 ft.	Bottom	1	27	2 men
4	7 ft.	Bottom	1	15	2 men

Average penetration—60.2 in. per min.

Test 2—RD 1⅝-In Bit With Rake

Hole	Depth	Location	Time Min.	Time Sec.	Remarks
1	7 ft.	Bottom	1	33	2 men
2	6 ft.	Bottom	1	30	2 men
3	7 ft.	Bottom	1	33	2 men
4	6 ft.	Top	1	22	2 men
5	6 ft.	Bottom	1	30	2 men
6	6 ft.	Bottom	1	26	2 men

Average penetration—51.1 in. per min.

Test 3—RD 1⅝-In K9 Bit Without Rake

Hole	Depth	Location	Time Min.	Time Sec.	Remarks
1	2 ft.	Bottom	1	05	3 men refused to use bit
2	6 ft.	Bottom	1	40	3 men, pushing hard
3	7 ft.	Bottom	2	00	3 men, pushing hard
4	7½ ft.	Bottom	3	05	3 men, pushing hard
5	7½ ft.	Top	2	15	3 men, pushing hard

Average penetration—36 in. per min.

were able to perform easily with the rake-type bit.

Examination of the bits made by Rogers Bros. also revealed a distinct rake. To provide the coal company with the type bit required to drill the hard anthracite, Kennametal agreed to manufacture a special bit to Rogers specifications. They used the Rogers pattern as a guide in designing the bit. These are now supplied to Rogers Bros. as Special RD 1⅝-in drill bits.

The time studies (left) taken under similar conditions illustrate the importance of the bit rake in getting fast penetration with a minimum of effort.

SAVINGS WITH CARBIDE BITS

A reduction of 33% in drilling time with two instead of three men has been the top benefit from converting to carbide drill bits. About 150 ft of drilling is done per place per shift by a two-man crew. The same drill bit is used for 26 holes after having been reconditioned after each shift, or 150 ft, of drilling. Some bits have been resharpened 35 times and have drilled a total of 4,500 ft. A total of 1,040 tons is mined per average bit, yielding a bit cost of $0.004 per ton.

While comparative cost with steel bits is not available, Rogers Bros. has not found it necessary to replace a blacksmith, who retired, and who had been kept busy sharpening steel bits. Carbide bits now are resharpened by a shop mechanic who spends an hour per shift on the resharpening job. Another important saving has been in cost of maintaining drill armatures. Labor and material costs previously were quite high and an electrician was required full time to handle the job. Although some air drills have been added and fewer electric units are in service, management reports that maintenance per drill has been reduced considerably. It is unusual to have more than one armature failure per month.

MINING THE COAL

Coal is being produced from the Dunmore Nos. 1 and 3 beds whose thicknesses range from 36 to 48 in. The Dunmore No. 1 bed is free of rock and boney but the No. 3 bed contains bands of both. Development also is underway to produce coal from the Clark bed, which is about 7 ft thick and lies 20 ft above the No. 1 Dunmore. The beds pitch about 12% in the area to be mined from the present opening.

The coal beds were tapped by a combination belt-haulage and supply slope driven 16 deg with the horizontal. Two 26-in Joy belt conveyors in tandem transport coal up the slope to a 250-ton steel bin. The first unit is 465 ft long and terminates at the intersection of the slope and the No. 1 Dunmore bed. The second conveyor is 350 ft long and extends to the intersection of the slope and the No. 3 Dunmore. Both are powered by 75-hp 440-v AC motors.

A third Joy belt is installed in a second slope driven in the No. 1 Dunmore from the intersection of the main slope and the coal bed. It will extend 1,000 ft on a 10-deg slope and terminate where the coal begins to dip sharply. When this unit has reached its limit, another belt will be installed in an entry developed along the strike. All coal in the No. 1 Dunmore will be mined up the pitch with chain conveyors. The inby main-slope belt and the No. 1 Dunmore belt dis-

REBUILT chain drive is checked by Thomas Hunter, day master mechanic.

MINE FOREMAN William Walters supervises underground work.

charge onto a Syntron feeder which transfers the coal to the outby belt.

As the No. 1 Dunmore slope is being advanced, counters are advanced along the strike with chain conveyors. Chambers on 60-ft centers then are driven up the pitch from the counters with chain conveyors. Chambers are driven 17 ft wide to a depth of 240 ft. Pillars are extracted on the advance with scraper conveyors which discharge into chain conveyors in the counters. The chains discharge onto the No. 1 Dunmore slope belt.

CONCENTRATED MINING IN BELT PANELS

The Dunmore No. 3 method of mining is an example of concentrated panel mining including both up-pitch and down-pitch methods. Panels are projected 9,000 ft deep along the strike and 1,200 ft wide, with 900 ft, or 75%, laid out for up-pitch mining.

One half of the coal is extracted on the advance by up-pitch methods and the remainder is recovered on retreat by a combination of up-pitch and down-pitch methods. Chain conveyors are used to develop chambers and counters, and scrapers are used to recover pillars. Two 26-in Joy belt conveyors, driven by 20-hp 440-v AC motors, are operated in tandem to haul coal from the panel to the main-slope belt. Conveyors are equipped with U. S. and Goodyear rayon-nylon combination belt joined with Flexco splices. Damaged belt is repaired underground with Rema self-vulcanizing materials supplied by the Flexible Steel Lacing Co.

Development of the panel is begun from the main slope by driving a center belt heading with airways on both sides along the strike. The down-pitch airway is called a "water gangway" and is driven primarily to serve as a sump and drain water from the belt heading. It also is used to store bottom rock lifted to provide clearance and level up the opening for the belt conveyor.

Coal and rock in the heading is loaded with a LaDel shaker equipped with a Goodman duckbill. Coal is transported in the airways by LaDel chain conveyors. Coal is drilled with Chicago Pneumatic handheld electric or Ingersoll Rand 3SJ air-powered rotary drills fitted with Kennametal safety drive sockets, augers and cemented-carbide bits. A two-man crew advances each place.

The 12-ft heading is advanced 6 to 18 ft per shift. The procedure is to shoot and load two cuts of coal, then shoot and load the rock, using the duckbill for both. A short section of a shaker pan is used to transfer rock from the heading shaker to a shaker in a crosscut leading to the "water gangway." This unit discharges the rock to the low side of the "water gangway." Thus rock is disposed of with a minimum of effort. The 17-ft airways are advanced 12 ft per shift by a two-man crew.

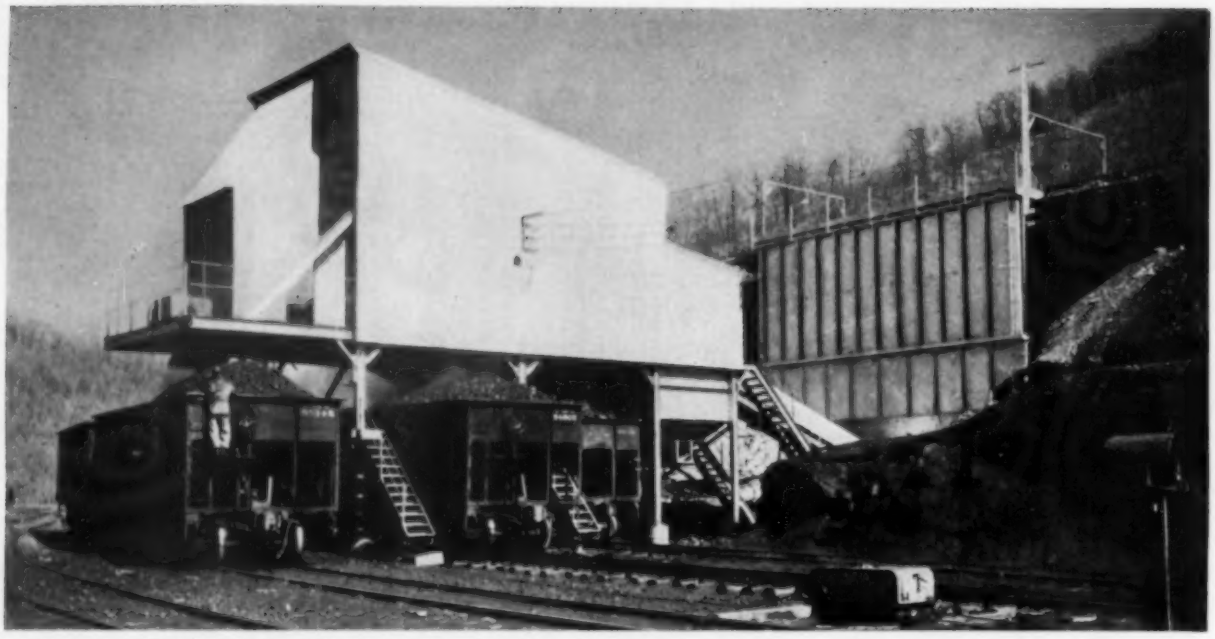
Ten holes are required per cut of coal in the gangway while 12 to 14 are drilled per cut in airways and chambers. Coal holes are charged with Independent C1 permissible powder and detonated with du Pont No. 6 caps or millisecond delays. Rock holes are charged with Independent 40% gelatin.

After the belt heading and airways are advanced far enough, a counter heading and airway are driven up the pitch with chain conveyors. After they have been advanced 300 ft, a counter gangway and airway are turned parallel to the belt heading and driven with chain conveyors. Chambers are driven 600 ft deep up the pitch off this counter. When they are 300 ft deep a second counter is turned parallel to the belt and used as a coal-gathering heading to handle coal from the chambers that are driven the remaining 300 ft to their limit, and also to handle coal from the pillar recovery. The 600-ft block up pitch from the first counter is recovered on the advance. When a chamber is driven to its limit, the chain conveyor is moved to a new chamber which had been necked on the advance from the counter. Ingersoll Rand scrapers are then used to recover the pillars. A six-man crew operates three scrapers while handling the pillar-recovery job. Scrapers discharge into a chain conveyor in the counter parallel to the belt. This conveyor in turn empties into a chain conveyor in the up-pitch counter and coal is carried to the belt conveyor.

After the belt heading and the parallel counter have been driven 300 ft beyond the first up-pitch counter, a new counter and airway are driven up the pitch to connect them. To permit pillar extraction to progress smoothly on the advance and coal to be handled in the counters with the chain conveyors, the head and tail sections of the chains are interchanged and the chains then reversed to carry coal to the next inby up-pitch counter. As the pillar line advances the chains are shortened. The accompanying map on p 75 illustrates the method of developing and working a panel.

Movement of conveyors to new chambers is handled on the night shift by a five-man crew that also delivers supplies. The crew moves two or three units per night, resets them and has them ready for use the following day. In removing a chain conveyor, the crew takes full advantage of the conveyor drive to reduce human effort.

The procedure is as follows: First, the chain is separated at the tail section and the tail section is uncoupled. The tail section then is placed in the conveyor line and attached to the chain. The drive is started and the tail section is pulled ahead a pan length. The last pan is uncoupled and placed in the panline and attached to the tail section. The drive is started again and tail section and pan are moved ahead another pan length. This procedure of removing a pan at a time is continued until the complete conveyor line is removed. As the sections reach the conveyor drive, they are removed and taken to the new location.



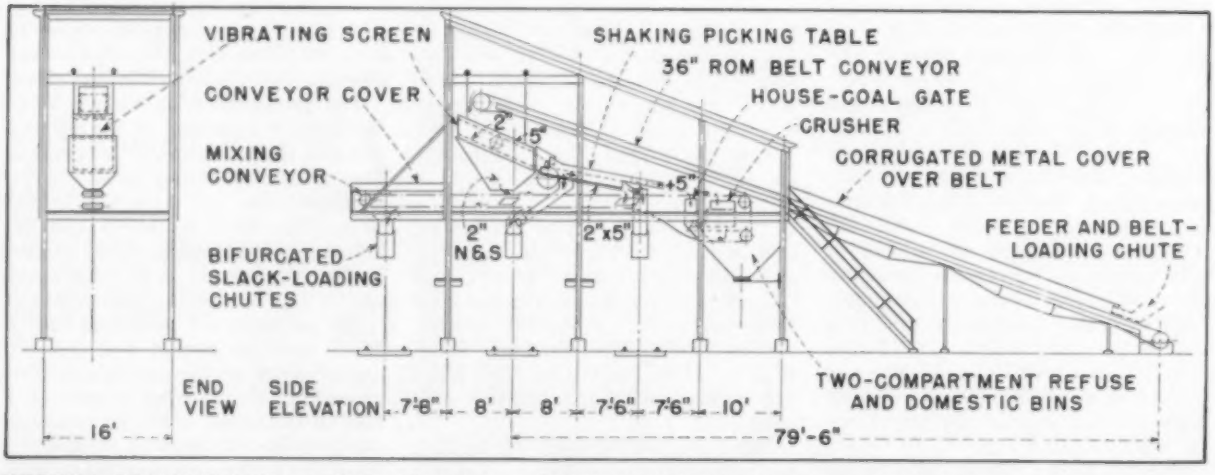
COMPACT DESIGN provides 160-tph three-track tipple with screening, picking, crushing and mixing facilities in plant only 16 ft by 48 ft 8 in. Balcony at left carries mixing conveyor drive and lean-to housing counterbalance for the table.

Compact Plant . . . Big Job

Unusual arrangement for three-track tipple packs facilities for screening, picking, crushing and mixing 160 tph in small plant space.

"THE MOST FOR THE MONEY and the biggest little tipple you ever saw" is a comment that aptly describes the new all-steel tipple recently completed at Big Creek mine of the Merrill Coal Co., Big Creek, Logan County, W. Va., to replace a plant which burned in November, 1953. From that date until completion of the new plant on Feb. 1, 1955, the mine operated with temporary preparation and loading facilities.

While the new tipple is only 16 ft by 48 ft 8 in, it can handle 160 tph. It normally loads three sizes to three tracks, and is equipped with complete screening, picking, crushing and mixing facilities. The 400-ton raw-coal bin takes advantage of a most unusual construction to reduce cost.

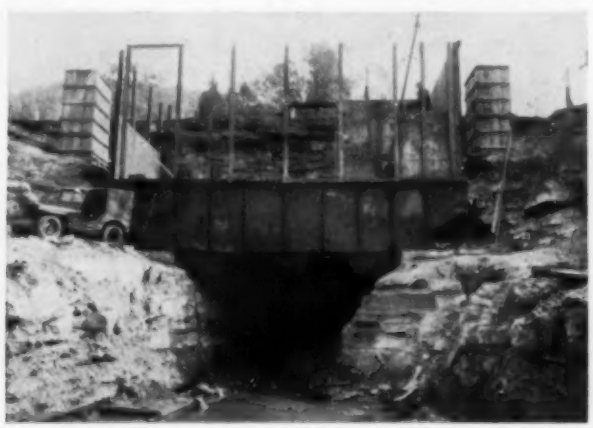


MERRILL COAL'S PLANT was designed to keep maintenance costs low as well as for limited space. All-steel tipple normally loads three sizes on three tracks. Plant was erected in 2-wk period during worst of winter.

PREPARATION RESULTS in limited space are obtained by use of a vibrating screen, shaking picking table of unusual design and double-section chutes in place of booms.

COST-CUTTER in construction of 400-ton dump bin was the use of two obsolete 70-ton railroad cars set side by side for base section, with 16-ft steel extension on top.

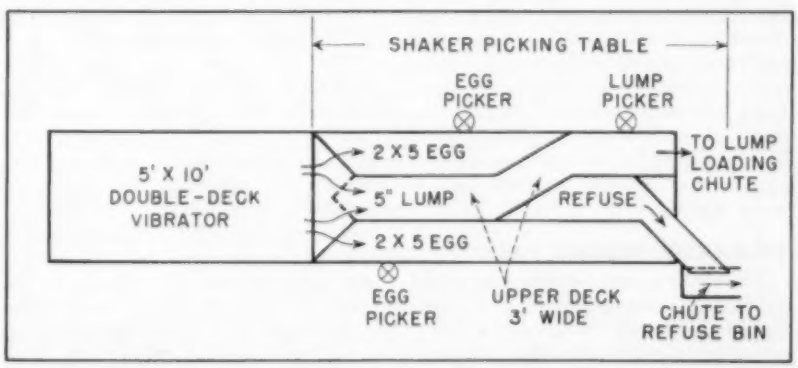
SHAKING PICKING TABLE is installed under R-O-M belt and has two decks for picking 5-in lump and 2x5 egg.



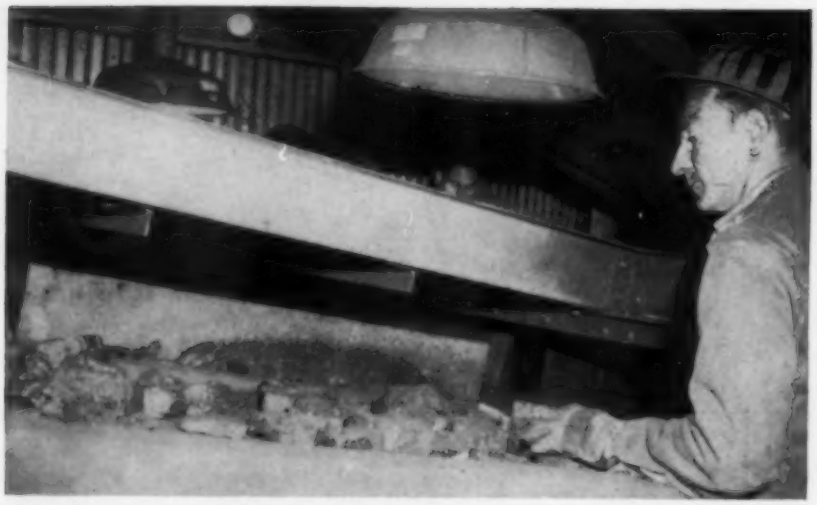
IN CONSTRUCTING unusual dump bin, the two railroad cars were installed with sides tight against each other.

A preliminary plan and general specifications for the plant were drawn up by C. W. Jones, president and general manager, and V. W. Lilly, outside foreman, and then were turned over to the Kanawha Mfg. Co. to make the detailed design, fabricate the steel and certain other parts, and erect the plant. Utilizing foundations installed by the coal company, Kanawha handled the entire construction in the 2-wk period from Jan. 17 to Feb. 1, which turned out to be the worst weather of the winter.

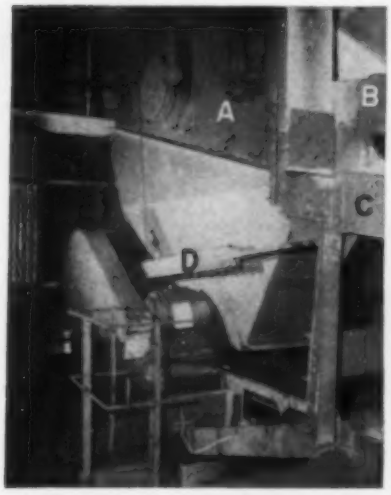
The Big Creek operation mines the Alma seam which is a high-volatile coal of firm structure. Seam thickness is 44 in, including a 2-in bone parting



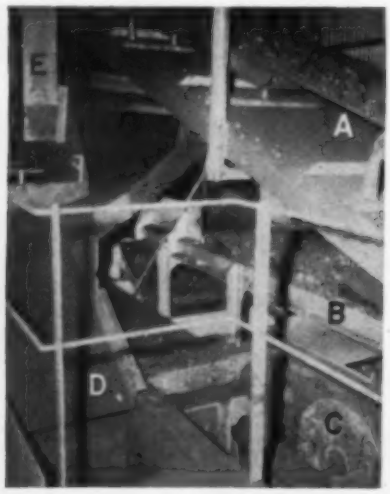
CENTER SECTION of lower deck of shaking picking table serves as refuse conveyor readily accessible to all picking stations (see photos on following page).



AT SHAKING PICKING TABLE, egg picker puts slate on center section of lower deck serving as refuse conveyor. Vertical plate prevents refuse from getting onto the third section of the lower deck handling the other half of the egg coal. The upper deck of the shaker shown in photograph carries lump coal.



EQUIPMENT SETUP—R-O-M vibrator (A), upper and lower decks (B and C) of shaker picking table and crank arm (D) driving the shaker.



FROM END OF TABLE—R-O-M belt (A), top run (B) of mixing conveyor, crusher (C), refuse chute (D) and hanger board E) of picking table.

5 in from the top. Joy 14-BU machines load into shuttle cars which discharge into 3-ton dropbottom mine cars. Present production is 800 tons from two underground shifts and one tipple shift. The A. T. Massey Coal Co. is the exclusive sales agent and places most of the product in the steam market.

TWO-LEVEL PICKING TABLE

The tipple's compactness is achieved by using a vibrating screen, a shaking picking table of unusual design, and double-section chutes in place of conveyor-type booms. A flight-type mixing conveyor, encircling the crusher at the lump-track end, is the only conveyor in the plant except for the R-O-M belt conveyor.

The raw coal discharges onto a 5x10-ft Link-Belt CA2510 vibrator, which has a top deck of punched plate equivalent to 5-in round and a bottom deck of woven screen equivalent to 2-in openings. The 2-in nut-and-slack drops directly into the car-loading hopper. Five-inch lump moves onto an upper deck of the shaker picking table and the 2x5 egg to the lower deck which is 5 ft wide. The upper deck, 3 ft wide, is positioned along the center, angling off from center to the left side of the table where the lump picker is stationed. He need only push the pieces of refuse away from him so that they drop off the deck directly onto the center section of the lower deck, which serves as the refuse conveyor.

The 2x5 egg from the vibrator is split into two streams on the lower deck of the table, one stream along each side. The egg pickers, one stationed on each side, toss the slate a few inches to the center, or refuse-conveying, section. Refuse moves into a chute leading directly into one compartment of a truck-loading bin. The other compartment is for domestic coal.

With the mixing conveyor and an arrangement of valves, lump or egg or both can be diverted through a Gundlach four-roll double-stage crusher and the product moved to any one of the three tracks.

CHUTE DESIGN CUTS BREAKAGE

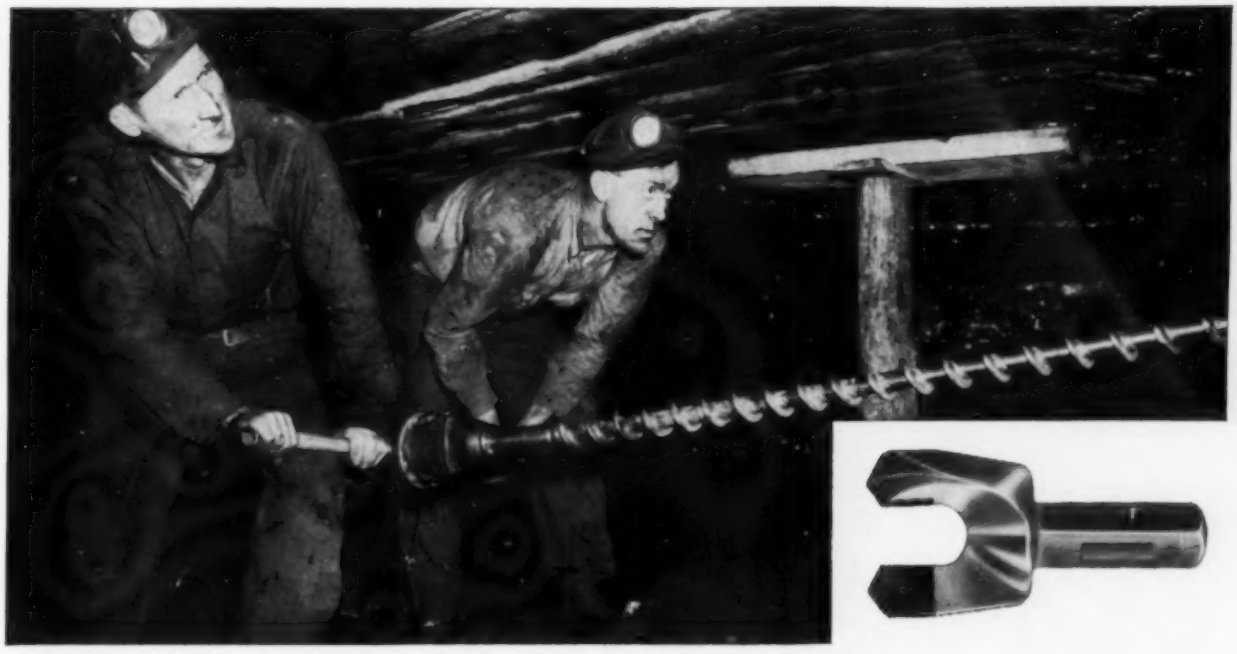
The loading chutes consist of two hinged sections in tandem, with means of independently controlling the elevation of the ends of each section. This arrangement provides a good substitute for a conventional-type conveyor boom and makes breakage a minor factor. The control for each section is a hand windlass and wire rope.

Since the shaking picking table is a single unit, a compact metal-weighted counterbalance operated from the shaker crankshaft is provided. Practically no vibration is imparted to the tipple structure.

Low maintenance was an objective in plant design. All bearings except those on the shaker crankshaft are of the antifriction type. Automatic pressure cups on the crankshaft are filled daily, and the antifriction bearings will be repacked with grease twice a year. The mixing conveyor consists of Type 678 Link-Belt oilless chain, operating on high-carbon bars with coal dust as the lubricant. The plant is truly of all-steel construction, since even the floor is steel.

Motors are General Electric Tri-Clad 440-v units, and the control center is a G-E Cabinetrol that includes interlocks and timers for automatic sequence starting.

The 400-ton steel bin into which the mine cars dump was built by the coal company and features an unusual design that effected a considerable saving in construction cost. The base section consists of two obsolete 70-ton hopper-bottom railroad cars purchased from the C. & O. Ry. They were placed side by side and a 16-ft steel extension added to the top. The mine-car dump track is over the center. Car bottoms were altered to provide center hoppers. A McNally-Pittsburg reciprocator feeds to the 36-in R-O-M belt.



Bit cost reduced 51 percent at Peters Creek Coal Company using Kennametal* D-3-inch Bits

High in the mountains of southern West Virginia, the Peters Creek Coal Company is maintaining a shift average of a brisk 21-ton per man mining out fingers of its Eagle Seam using Kennametal D-3-inch Bits.

In this seam, mining is normally limited to the 28-38 inches of coal sandwiched between two bone bands. This coal is exceedingly difficult to cut and drill, and face preparation requires major attention.

Kennametal Bits are used by the Peters Creek Coal Company as a result of drilling tests made several years ago as a part of a modernization program to increase production. For a two-month period, conventional steel and Kennametal D-3-inch Bits were tested. Accurate bit cost records proved that, during that period, the cost of conventional steel bits was $187.00. The cost of the Kennametal Bits was $92.50 . . . a saving of over 50 percent.

You learn to expect this type of performance when you use Kennametal. When next you buy, be sure to specify these quality, sintered carbide bits. They'll cost you less in the long run. Write to KENNAMETAL INC., Mining Tool Division, Bedford, Pennsylvania.

*Registered Trademark

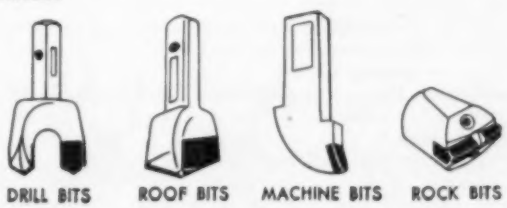
The best measure of tool performance is bit cost per ton of coal

Peters Creek Coal Company, like other practical mine operators, has found that there is only one measure of mining tool performance . . . that is, *bit cost per ton.*

Why not let your Kennametal Mine Service Representative demonstrate Kennametal's ability to help you hold bit cost down to a minimum by showing you actual performance records? You will find not only that Kennametal Bits last longer, make drilling easier, improve rates of penetration, and increase coal production, but also that Kennametal Bits need reconditioning less often and cause little strain on equipment.

These records are due to one factor . . . Kennametal is the only sintered carbide producer that owns complete facilities for production of tungsten carbide tools, from raw materials to finished product . . . and so is able to maintain rigid quality control throughout every stage of production from mining select ores through complex phases of refining and manufacturing. The end result is less bit cost per ton of coal mined.

INDUSTRY AND
KENNAMETAL
. . . Partners in Progress



FOREMEN'S FORUM

SPARKLING IDEAS, like miner-mounted roof-bolting drill (left), slurry-spitting rockduster and cable hauler, are end products of a deliberate process. Usually, ideas are neither accidents nor miracles.

How You Can Produce Ideas

Do you envy the fellow who seems to be able to pull show-stopping ideas apparently out of thin air?

You can do it too, if you will seek idea opportunities, then apply idea-production rules.

THIS DEPARTMENT always has come out strong on the value of generating new ideas which will contribute to more efficient operations. We have on other occasions described the 5-step operation of producing ideas. As you will recall, the process includes (1) gathering pertinent data, (2) assimilating and digesting these data, (3) permitting the ingredients to simmer in your mind, (4) standing by as the idea takes on form and substance and (5) refining and applying the idea.

While keeping this process inviolate, we now venture into a more detailed analysis of this matter of ideas, citing chapter and verse on how to march boldly into a messed-up situation and come up with fresh ideas for straightening it out. That's a big order, but let's see what we can do with it.

There are three different idea types, as follows:

1. **Original ideas** are those which result in the creation of something where nothing existed before. The new creation may be an art or a device.

2. **Remedial ideas,** as the name implies, are those which result in the development of a better method or device to supplant a relatively inferior method or device.

3. **Improvement ideas** are those which result in additions or improvements to existing methods or devices.

We shall pass over original ideas with minimum stress since these are more or less in the realm of the inventor and professional designer. For our purposes, we classify as original those grand ideas which a supervisor would not be expected to generate as part of his job. Big ideas, like rediscovering Davy Crockett, for example. Real big, we mean.

The other classifications—remedial and improvement—are right down our alley. A foreman spends a lot of time in these areas.

PRODUCING REMEDIAL IDEAS

Picking an example of a remedial idea right out of this hot July air, consider the problem of a very young child who is presented with an ice cream pop on a stick. He munches contentedly, getting most of it on him but some of it in him, until time and heat cause the ice cream to soften and fall away from the stick. Now we have a raging 3-yr-old and a furious parent, both casting aspersions on the ice cream company.

Well, there is our situation. What can be done about it?

Actually, the solution is so patently simple we are surprised the ice-cream-pop manufacturers missed it. All that is needed is a corrugated, serrated and/or perforated stick. The corrugation, serration and/or perforation will create a better bond between the ice cream and stick, giving the youngster more time to work on it. (You're welcome, Eskimo Pie Co., but test it first.)

That's an example of a remedial idea, one which results in a better way of doing things. Any number of remedial ideas may have been developed right at your mine. We have in mind such things as track clamps for quickly repairing broken rails, lump-breakers on loading ma-

COULD FILL 48,000 RAILROAD CARS PER MONTH! Owned by a major coal company, this electric shovel weighs approximately 3,500,000 pounds and has a dipper capacity of about 50 cubic yards. Nevertheless, the mammoth machine is capable of climbing grades steeper than 20%! To help it achieve maximum performance in this grueling work, its owners, after testing nearly every major brand of gear lubricants, chose Cities Service L Compounds for the job. The results have justified this choice.

BIG job . . . BIG machine . . . BIG lubricants!

Gear Oils Of Almost All Major Refiners Were Tested In This Giant Shovel. Cities Service Got The Job.

This giant 50-yard shovel is one of several currently in use by a major coal company. This same company also employs in its strip-mining operation, an extensive fleet of haulage trucks, bulldozers, earthmovers, coal preparation plant equipment, and miscellaneous vehicles.

Not long ago, it was decided to attempt to simplify and standardize the gear oil requirements of this equipment. Following this plan, the company first tested the gear oils of nearly every major refiner. The result: Cities Service L Compounds were chosen to do the job!

Again and again, where there's a big job to be done, mining men turn to Cities Service . . . because they've found Cities Service lubricants do the job better, do it easier. And the same is true of Cities Service Lubrication Engineers. If you have a lubrication problem . . . or if you'd simply like to check the efficiency of your present lubrication procedures, why not call in an expert Cities Service Lubrication Engineer. Simply contact your nearest Cities Service office or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

chines, improved trolley-and-feeder hangers and so on. The list is almost endless, and every issue of *Coal Age* will show some remedial ideas in the Operating Ideas Department.

PRODUCING IMPROVEMENT IDEAS

Improvement ideas, on the other hand, may be thought of as refinements of existing practices or machines.

Consider the automatic washing machine in your home laundry. The lady of the house inserts soiled clothes, closes the door, flips a switch, waits for the water to enter the machine, adds some soap, and the machine does the rest.

If you have ever operated one of these machines, you know that if you put in the soap before the water shuts off, great activity ensues. Suds appear in great clouds to the point where one is convinced he is trapped inside a marshmallow.

We contend the process is not automatic until the operator can leave the machine before the water shuts off, and we have an idea for achieving that end. The proper amount of soap for a 9-lb wash, we say, should be encased in a soluble capsule that will melt away just about the time the water ceases to flow into the washer. The capsule is to be inserted with the soiled clothes when they are put into the washer. Then the operator can close the door, flip the switch and walk away.

The foregoing example, ridiculous we admit, is offered to illustrate the situation as we have seen it develop in continuous mining. Over the past 6 or 7 yr we have seen a parade of improvement ideas designed for the specific purpose of making continuous mining more nearly continuous. In-cycle roof-bolting, improved intermediate transportation and better maintenance procedures are such improvement ideas. Each has resulted in higher over-all efficiency until we now see continuous mining making new records every day.

OVER THE FIRST HURDLE

The big stumbling block is: How does one get his idea-generating mechanism started? Let's explore this one in the following 6 or 7 column-inches.

In the first place, we think a fellow should decide whether the situation he faces demands a remedial idea or an improvement idea. Why? Because making this distinction quickly focuses one's attention within certain limits. It discourages "scatterbrain" thinking right at the outset. Merely knowing whether you should correct a bad condition or improve on an existing situation is a big help, isn't it?

But even before you can decide what type of idea to employ, you must have satisfied one other demand. You must first recognize a need. All of us blithely pass by many opportunities to create ideas simply because we don't see the need for them.

One fellow with a given store of native intelligence may seldom come up with a worthwhile innovation, while another fellow with no more gray matter seems to be a veritable fountain of good ideas. What makes the difference?

Introducing HAPPY HAROLD
HE BRUSHED HIS TEETH EVERY DAY WITH A NATIONALLY ADVERTISED TOOTH BRUSH AND A MIRACULOUS TOOTH PASTE THAT KILLED GERMS, KEPT HIS TEETH WHITE AND GAVE HIM AN IRRESISTIBLE SMILE
THE DOCTOR EXAMINED HIM TWICE A YEAR
HE WORE RUBBERS WHENEVER IT LOOKED LIKE RAIN
HE SLEPT WITH THE WINDOWS OPEN, AT LEAST 8 HOURS EVERY NIGHT
HE STUCK TO A DIET OF FRESH VEGETABLES
HE RELINQUISHED HIS TONSILS AND TRADED IN SEVERAL WORN OUT GLANDS
HE GOLFED, BUT NEVER MORE THAN 18 HOLES
HE NEVER SMOKED, DRANK OR LOST HIS TEMPER
THE FUNERAL WILL BE HELD NEXT WEDNESDAY. HE IS SURVIVED BY 18 SPECIALISTS, 4 HEALTH INSTITUTES, 6 GYMNASIUMS AND NUMEROUS MANUFACTURERS OF HEALTH FOODS AND ANTISEPTICS.
HE FORGOT TO TEST THE ROOF

—Reprinted from Hanna Coal News.

DETERMINING IDEA NEEDS

The fellow who generates ideas has trained himself to look for idea opportunities. He produces ideas deliberately. How does he proceed? He may use any or all of the following four methods:

1. Study cost sheets, production records, parts-inventory records and similar forms, when available, to detect departures from normal trends. In other words, if the cost of coal cutting should show an unusual rise in a certain period, the need for an idea is apparent. Why did the cost go up? Did conditions change? What's to be done? Perhaps a new type of bit should be tried, or the kerf should be made in a different part of the seam? Those are remedial ideas.

2. Look for patterns. Most safety ideas are designed to reduce the frequency of occurrence of repetitive accidents. If an undesirable event occurs a second time, a remedial idea is called for.

3. Seek out the causes of downtime in machines. Discovering the causes of downtime will itself suggest a solution perhaps.

4. Study the properties of different materials in search of new applications for these materials. The use of stainless steel in chutes is not an accident. Some one studied the material and the duty, and found that stainless steel would work to advantage.

Now let's review step-by-step the process of producing ideas deliberately.

First, look for idea opportunities, thus establishing the area of need.

Second, decide whether a remedial idea or an improvement idea is called for.

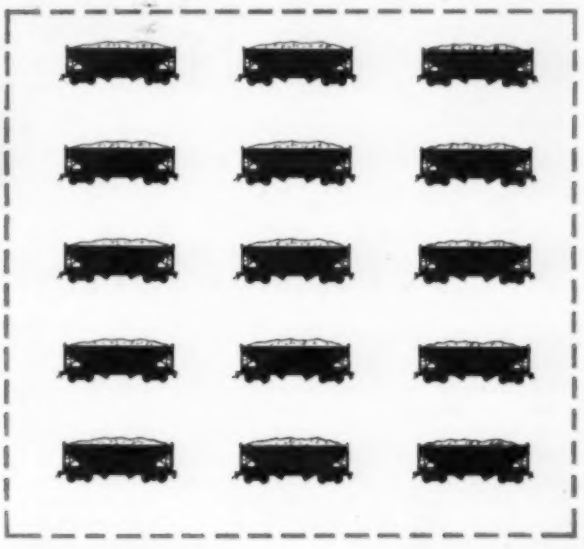
Finally, observe the five requirements: Gather data, digest it, let it simmer, see the idea, refine and apply it.

Ideas are not accidents nor miracles. They are the logical ends of deliberate action. You can produce one any time you care to make the effort.

And our parting shot is that ideas are competitive. The organization that produces them has the easier sledding and the best in earnings.

FROM 40 TPH

TO 600 TPH



THE CHANCE PROCESS CLEANS COAL
at minimum cost per ton

Regardless of the amount of coal to be cleaned — as little as 40 tph or as much as 600 tph — there is a Chance Process cone to handle it economically. Preparation plant owners find the Chance Process the most efficient method of cleaning all types of coal. It is not only dependable, but it also offers many other advantages to the mine operator:

HIGH SEPARATING EFFICIENCY—With the Chance Process, there is almost 100% recovery of salable coal. The washing gravity is not affected by fluctuating rates of feed. The efficiency remains constant.

WIDE FLEXIBILITY—Coal is handled at gravities from 1.35 to 1.65, with sizes ranging from 10" to ⅛". A change of gravity can be made in less than five minutes, simply by opening or closing valves.

ECONOMICAL OPERATION—The heavy-duty construction of the Chance Process equipment gives trouble-free performance. The operation is low in cost for it requires the part-time attention of only one man.

Our engineers will be glad to help you select the most economical unit for your preparation plant.

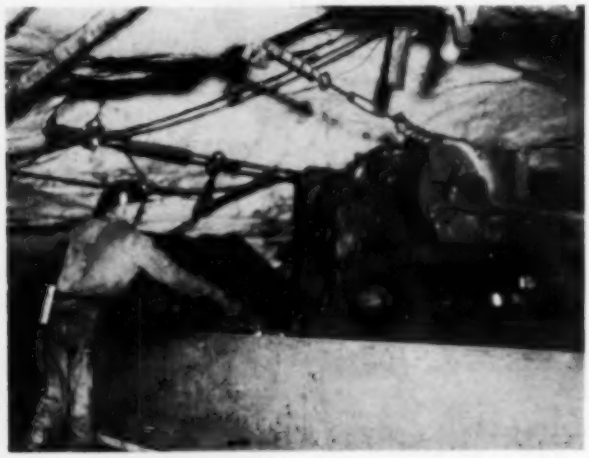
THE HEART OF THE PREPARATION PLANT®

UNITED ENGINEERS & CONSTRUCTORS INC

NEW YORK 17 **PHILADELPHIA 5** CHICAGO 2

WITH A BACKGROUND OF OVER SEVENTY YEARS' EXPERIENCE

OPERATING IDEAS



FOR NON-SPILL LOADING, low-cost flat pan is in place to catch coal as trip is moved ahead (left). Then, attached to suspended hook, pan tips as trip moves forward, thus dumping spill coal into the next car (right). Boom man pushes remainder out, releases hook and slides pan back along the edge of the car to its next position.

Belt-Spillage Pan Effortlessly Moved to Next Car

THE COMMON OBJECTION to a low-cost pan for nonspill continuous loading at a belt head, as compared to a pivoted chute or reversing conveyor, is the physical labor involved in moving the pan from one car to another. How it is done with a minimum of effort in the Wyoming mine of the Red Jacket Coal Corp., Wyoming, W. Va., is shown in the photographs above.

About the time the stream of coal from the belt has traversed the pan and begins spilling into the empty car, the boom man places an overhead-suspended hook in a hole in the center of the front edge of the pan. As the cars move forward, the hook raises the end of the pan and dumps the spill coal into the oncoming car. Deftly and without much physical effort, the boom man then pushes any remaining coal out of the pan, releases the hook and slides the pan along the top edge of the car to the next position bridging that car and the following empty.

The hook hangs from a rod that is one of the two strain guys holding the conveyor head. The hook support is Y-shaped, with eyes at the upper ends that encircle the anchor rod.

In contrast to more complicated devices which require taking more top rock, the manually-moved pan necessitates no extra clearance between the conveyor head and the top of the coal in the mine car. At the Wyoming mine, the seam mined is 30 in thick and the cars carry 4.1 tons. (See p 72-73 for details of air-shooting methods at Wyoming mine.)

Power Shovel Handles Pumphouse Quickly

PORTABLE PUMP-AND-HOUSE UNITS designed for moving by power shovel have simplified the job of setting up new pumping stations in iron ore pits at Benson Mines, Jones & Laughlin Steel Corp., Star Lake, N. Y., reports *Engineering and Mining Journal*, another McGraw-Hill publication. Each pump is housed in a sheet-metal structure placed on an angle-iron framework on skids, with lifting eyes and hooks provided for lifting with a sling by power shovel or crane. An electrical receptacle speeds power hookups.

The mine staff planned fabrication of the handy pumphouses for use with 6- and 8-in Nagle SW-OB and 4-in QW pumps handling surface drainage. Large-diameter heavy-duty rubber hose and lightweight Naylor pipe are used for discharge lines.

Some of the pumphouses feature gable doors and a cantilever extension of an I-beam ridge pole, to facilitate lifting and removal of the motor or pump for repairs. Screens around the base prevent damaging matter from entering the inlet.

TOPS IN TEAM WORK—ALL THREE

each does a special job

J&L's JALTEN series offers you three top performing high strength, low alloy steels with the following characteristics:

JALTEN NO. 1—High strength, good formability and fabricating—good resistance to low temperature impact.

JALTEN NO. 2—High strength, moderate forming—improved resistance to atmospheric corrosion.

JALTEN NO. 3—High strength—improved abrasion resistance.

J&L STEEL

SEND FOR THIS NEW BOOK:

Chemical properties of Jalten
Mechanical properties of Jalten
Jalten equivalents
Jalten application data

Jones & Laughlin Steel Corporation
Dept. 411—3 Gateway Center
Pittsburgh 30, Pennsylvania

Please send a copy of your Jalten booklet, *JALTEN LOW-ALLOY, HIGH-STRENGTH STEEL.*

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Jones & Laughlin
STEEL CORPORATION — *Pittsburgh*

FAIRMONT *makes the* DIFFERENCE . . .

In up-grading your coal product *ECONOMICALLY!*

Fairmont is the modern approach to coal preparation . . . an approach based on coordinated planning to achieve increased separating efficiency at low operating economy.

With Fairmont built preparation plants... here's the difference...

- Let Fairmont provide the difference in upgrading your coal product. Fairmont-built preparation plants guarantee product uniformity and over 99% separating efficiency through a wide product size range of ⅛" to 10" in any tonnage capacity.

Call a *Fairmont* Engineer!

1 Planned, qualified design, engineering, fabricating and erecting services.

2 Independent selection of equipment best suited to specific requirements.

3 Skilled pilot crews train your own crews in efficient operation.

4 Each installation designed to meet present and future requirements.

FAIRMONT MACHINERY COMPANY

FAIRMONT, WEST VIRGINIA

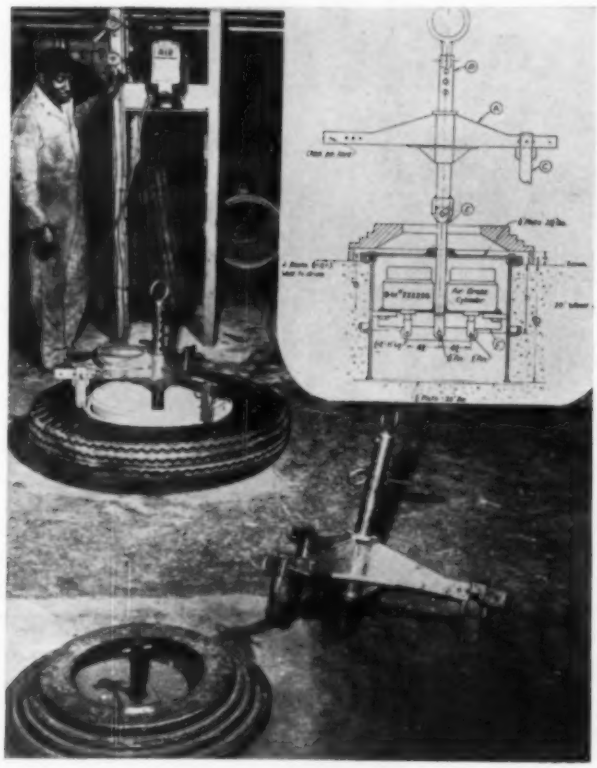
DESIGNERS AND CONSTRUCTORS OF COMPLETE COAL PREPARATION PLANTS USING BOTH WET AND DRY CLEANING, CENTRIFUGAL AND THERMAL DRYING.

Modified Scraper Eases Rock-Loading Operations

ALTERATIONS to a track-mounted slusher loader have resulted in more safety for the operator and simplified the rock-loading job at Rogers Bros., Bell Mountain, Scranton, Pa. The first alteration was addition of a notched steel apron (left photo) to permit the track-mounted unit to be used to clean loose material from between the rails. The plate is hinged to the lower part of the frame and the notches rest on the rails when it is in position to clean the track. It bites into the loose material as the machine is moved along the track and plows it up into the machine. The material then can be transferred to a mine car with the scraper. Management reports that the cleaner works best when used on a downhill slope.

A small air tugger (right photo) was installed on the unit to permit the loader operator to handle the cars from the loader and thereby save considerable time and effort. Other modifications that have improved the loader include changing the position of the control handles to eliminate the danger of the operator getting hit by rock; kingpin mounting to permit loading on a curve; and altering end of boom to improve car loading.

Pneumatic Tire Mounter Simplifies Job



EASY, FAST AND SAFE mounting of heavy truck tires is possible with the aid of this pneumatic tire and rim mounting machine. Designed by engineers of the Autocar Div., The White Motor Co., Exton, Pa., the machine permits one man to do the job quickly and economically. And it is done without the risk of damage to tire and rim which exists with other methods. Before the device was built, it required two or three men to mount rims and tires for big heavy-duty Autocar trucks.

A stepped-down circular casting which can hold 20-, 22- or 24-in wheels or demounted rims sets over a 24-in-diameter pit, 18 in deep. The bottom of the casting is at floor level.

A pair of Bendix-Westinghouse 6-in air-brake cylinders with a 2¾-in stroke and a capacity of 1,500 to 2,000 psi are fastened to a plate in the pit below the floor level. Both cylinder arms are fastened to an 11-in cross piece of ½-in steel. A 2-in steel spindle rod attached to the center of this cross piece rises through the center of the stepped-down casting to about 5 in above the floor. A ⅝-in cross rod is mounted through the top of this spindle.

To mount a tire, the operator first places a rim base on the stepped-down casting. He then drops the tire on the rim base, slips the side ring on after and positions the locking ring.

Next he lowers a three-armed spider, hooks it on the spindle rod which comes up through the center of the pit and locks them together with a quarter turn. The three spider arms notch onto the side ring and force it and the bead of the tire down past the locking-ring seat on the rim as air is admitted to the air cylinders. With a sharp tap of a hammer, the operator seats the locking ring. The spider is released and the tire is ready to be inflated.

As a service to industry, Autocar offers to supply plans for the device to truck operators and fleet owners without charge.

NEW FROM CATERPILLAR!

TWO MODERN, COMPACT, HEAVY-DUTY DIESEL ENGINES

THE NEW
D342

THE NEW
D339

190 HP	**INTERMITTENT OUTPUT** Maximum recommended for loads of short duration (1 hour or less) with equal periods at idle or low load.	126 HP
171 HP	**RATED OUTPUT** Maximum recommended for loads of moderate duration (12 hours or less) with equal periods at idle or low load.	112 HP
152 HP	**CONTINUOUS OUTPUT** Maximum recommended for loads of unlimited duration.	100 HP

All at 1200 r.p.m. with full equipment

This is the same trouble-free engine which powers Caterpillar's mighty D8 Tractor. Coming soon: the new D342 Electric Set!

Balancers—standard equipment on the new D339—give this powerful 4-cylinder engine all the smoothness of 6-cylinder performance!

Here are the latest advances in diesel engine design. Compared to other engines in their class, these two new CAT* Engines offer you better operation, less maintenance, higher horsepower and more compact design. Take a quick look!

CHOICE OF STARTING SYSTEMS!

AIR

For fast starts where a supply of compressed air is readily available, a sturdy vane-type air motor is offered. Also available: air compressors and storage equipment.

ELECTRIC

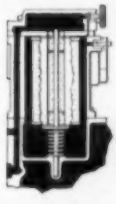
Where speed of starting is especially important. Also available: automatic start-stop controls which require no operating personnel.

GASOLINE

For all-weather starting. This system preconditions the diesel, and supplies full lubrication before diesel is started. Also available: electric starters for the gasoline starting engine.

ECONOMICAL FUEL SYSTEM!

Same famous tinker-free fuel system so successful on other Caterpillar Engines. Capsule-type injection valves with single, large, foul-proof orifices, plus special precombustion chambers, permit these engines to operate—even idle—on low-cost non-premium fuels. And full-flow filtering is assured with new paper-type element that is not affected by water.



FIELD-TESTED PISTON ASSEMBLIES!

Pistons, rings and rods in these two new engines are like those used in Caterpillar's famous V-type Engines. Heat plugs, chrome-faced rings, cast-iron top ring bands give thousands of hours of operation before inspection is necessary.

MANY OTHER IMPORTANT FEATURES!

BRIEF SPECIFICATIONS

D342		D339
Four-cycle, valve-in-head		
6	Number of cylinders	4
5¾ in. x 8 in.	Bore and stroke	5¾ in. x 8 in.
1246 cu. in.	Piston displacement	831 cu. in.
1200	Rated speed, r.p.m.	1200
425	Low idle speed, standard, r.p.m.	425

Your Caterpillar Dealer has full details on both of these compact, new engines. Call him today for modern heavy-duty diesels. And remember him, too, for prompt, complete installation and service.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

We'd be glad to send you more information on the new D342 and D339. Just mail the coupon below.

CATERPILLAR TRACTOR CO., Dept. 8594, Peoria, Illinois, U. S. A.

Send me complete details on the new D342 and D339.

Name_____

Address_____

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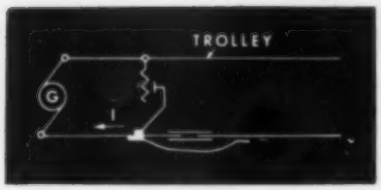
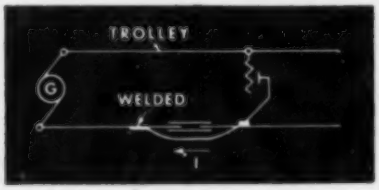
CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

THE D342 AND D339—LATEST EXAMPLES OF CATERPILLAR LEADERSHIP IN ACTION

Operating Tips for the Bond Welder





FIGS. 1 and 2—WRONG WELDING SEQUENCES: Welding terminal nearest substation first (Fig. 1) forces welding current through bond as second terminal is welded (Fig. 2) and sets up an electromagnetic field, frequently causing arc to blow out and making proper length of arc difficult to maintain.

FIG. 3—RIGHT SEQUENCE: Weld the terminal farthest from the substation first to avoid setting up electromagnetic field around terminal.

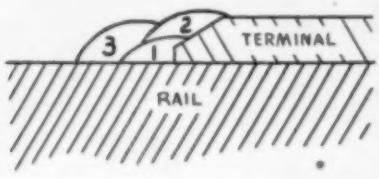
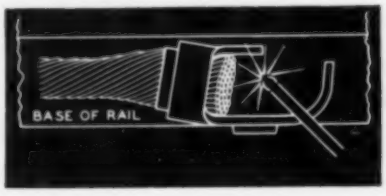
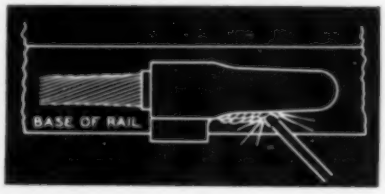
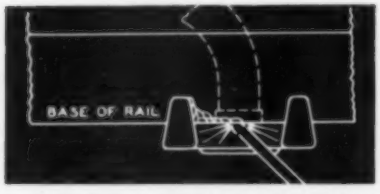


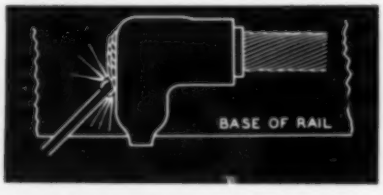
FIG. 4—FOR BOND with high strength, low resistance, three beads are recommended, in order shown.

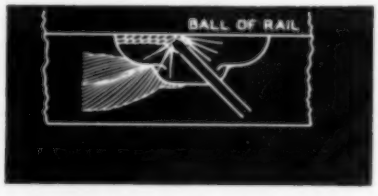




FIGS. 5 and 6—SUGGESTED APPLICATION of welding beads on two types of bonds, copper arc-weld at left and steel arc-weld at right. Ease of installation, long life and low resistance count in selecting bonds.







FIGS. 7, 8 and 9—OTHER TYPICAL RAIL BONDS, all of steel arc-weld type, with recommended bead application.

THE STRONGEST CHAIN is only as strong as its weakest link—the finest rail bond is only as good as the weld that holds it to the rail, points out the Ohio Brass Co. in a recent issue of its publication, *O-B Haulage Ways*.

If, for example, the rail isn't thoroughly cleaned before welding, if the weld bead is spotted with burned metal, if insufficient metal is deposited, or if improper current and voltage fail to give adequate penetration, you'll have a weak link in the chain of bonds that holds your circuit together.

These are a few of the many welding faults that can drastically lower the efficiency of your rail bonds. And they're only a token of the infinite number of problems a good bonder has learned to master through years of experience on the job. His knowledge extends far beyond the basic points mentioned in this article, the company emphasizes, but the suggestions that follow may prove helpful to the inexperienced bonder and may offer a tip to older hands as well.

CLEAN THE RAIL THOROUGHLY

Both the bond terminal and the rail surface should be clean and dry before welding. If the rail has a heavy scale of rust, the deposit should be removed with a cold chisel, and the surface then wire-brushed to bare metal. Coal or rock dust, grease, paint, etc., should also be removed to permit a solid, non-porous weld of minimum electrical resistance and high mechanical strength.

USE CORRECT VOLTAGE, ADEQUATE CURRENT

The heavier the welding rod, the greater the current required for good penetration and dense bead. For example, a current of 120 to 130 amp is about right for $\frac{5}{32}$-in steel rod, but you need about 150 amp when you jump to a $\frac{3}{16}$-in rod.

Best results are obtained with an arc about $\frac{1}{8}$ in long. A longer arc throws burned metal into the weld and gives an uneven bead—poor electrically as well as mechanically. The short arc gives better penetration and at the same time permits less exposure of the rod particles to air. Maintaining the proper length of arc, of course, is a skill that comes only with experience.

USE PROPER WELDING SEQUENCE

The first terminal to be welded to the rail should always be the one farthest from the power source. The reason for this, as shown in Figs. 1, 2 and 3, is to keep the welding current flowing through the rail joint rather than the bond itself. Otherwise, current will flow through the bond during the welding (because the bond offers a lower resistance path than the rail joint) and set up an electromagnetic field around the terminal. Such fields often cause the arc to blow out and make it difficult to maintain the proper arc length.

DON'T TRY TO FINISH JOB IN ONE PASS

Remember that you need good electrical conductivity as well as mechanical strength in your bond welding. Since steel has only about one-tenth the conductivity of copper, the weld area should theoretically be ten times the copper cross section. This area can be reduced in practice, of course, because of the short length of the steel in the circuit.

For best results three beads are recommended, laid as shown in Fig. 4. The first bead is laid between terminal and rail, being slightly heavier on the rail. The second bead is laid between the first bead and the terminal itself. The third bead joins the second to the rail and completely covers the first, as shown in Fig. 4. Figs. 5 to 9 show how the beads should be applied on five common types of bonds.

USE A HIGH QUALITY BOND

The cheapest bond isn't necessarily the most economical. You have to consider also the time it takes to install it, the length of time it remains in service, and the kind of job it does when installed—whether it offers high or low resistance to the current in your circuit.

A high-quality bond of the right type for the job is a worthwhile economy.

"They *saved* us more than they *cost* us!"

That's what Pond Creek Mine says about O-B Automatic Couplers

During a power failure in a section of Pond Creek mine, a trip of seven loaded cars (6 tons each) and a 15-ton locomotive rolled 600 feet down a 3½ per cent grade and crashed into an identical trip of stationary cars.

Despite the force of the impact, only two cars required extensive repairs in the mine shop.

"In this one accident alone," says T. B. Bandy, Superintendent of Pond Creek Mine, "the rubber draft gear on our O-B Automatic Couplers saved us more than their original cost!"

Veteran miners at Pond Creek have seen how this rugged O-B Coupler cushions 50-ton coupling impacts, how it forces skewed cars into alignment on the track, how its self-centering head and 30 per cent wider gathering range eliminates trip riders and the hazards of stepping between cars.

Their continuing preference for the O-B Automatic coupler is a matter of record — a record of safety, production, and low maintenance.

Write today for more information about the coupler that SAVES you more than it COSTS you.

Ohio Brass

MANSFIELD (B) OHIO, U. S. A.

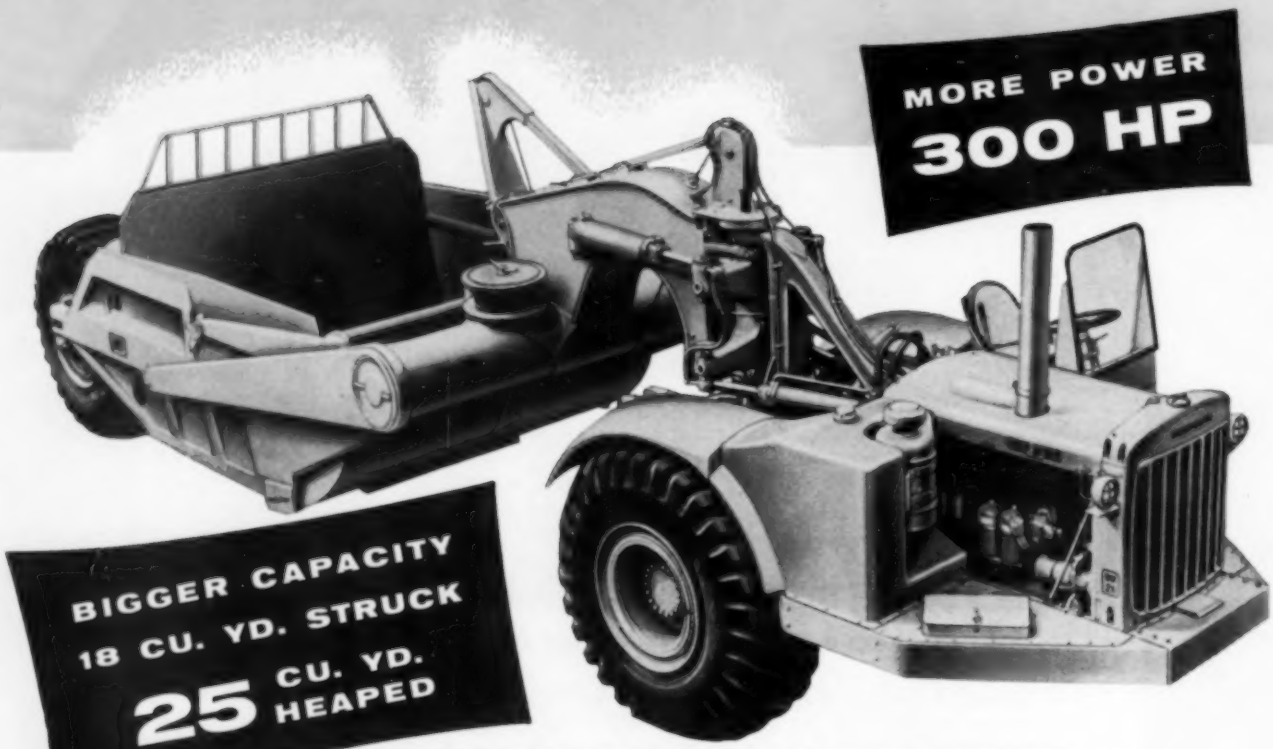
IN CANADA: CANADIAN OHIO BRASS CO., LTD., NIAGARA FALLS, ONT.

4585-M

Feeder and Trolley Materials • Control Materials • Trolley Shoes • Roof Bolt Shells and Plugs • Rail Bonds • Automatic Couplers

CATERPILLAR ANNOUNCES THE

New DW20-DW21 TRACTORS



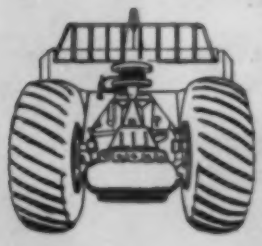
The new two-wheel CAT® DW21 Series C with new No. 470 LOWBOWL Scraper. The new four-wheel DW20 Series E is available with the new No. 456 **LOWBOWL** Scraper, or the new W20 Wagon. Wagon capacity—20 cu. yd. struck.

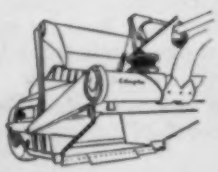
"BIG PRODUCTION" FEATURES OF THE NEW DW20-DW21

MORE POWER—300 HP at 1800 r.p.m. Ten per cent more rimpull. New 6-cylinder, 5⅛ x 6½ inch Caterpillar Engine. Requires only one operating adjustment. Has hydraulic valve lifters—fan belt tension regulated by convenient capscrew-adjustment of generator.

NEW TURBOCHARGER, driven by engine exhaust, utilizes energy which would otherwise be lost. Packs air into engine according to engine load, not speed. Delivers more working HP—greater performance.

NEW, BIG WIDE-SECTION 29.5-29 TIRES, developed after 3 years of Caterpillar and tire manufacturer research, have proved a success in extensive tests on actual earth-moving jobs. Operating at lower pressures and providing big-footprint flotation and wide-lug traction, they're standard on the new DW20-DW21. Optional—24.00-29 tires.





INCREASED HIGH APRON LIFT provides faster ejection of *any* material.

INCREASED SCRAPER GROUND CLEARANCE enables units to work even under extremely "soft" conditions.

HIGH SPEEDS FOR FAST HAULS:
DW20 (Series E), 2.8 to 32.1 m.p.h.
DW21 (Series C), 2.3 to 20.5 m.p.h.

CHOICE OF STARTING METHODS, optional 24-volt direct electric or gasoline starting engine with 6-volt starting motor.

LARGE AREA PUSHBLOCK gives better pusher contact, faster loading.

AUTOMATIC CABLE SAVER standard equipment.

Plus improved brake control, more easily removed DW20 hitch arrangement, better protected DW21 hydraulic steering system and many other new and thoroughly tested Caterpillar features.

...AND THE NEW LOWBOWL SCRAPERS

Cat DW20 and DW21 Tractors and their matched scrapers have won world-wide acceptance as the standard of money-making performance among earth-moving haulers.

Now Caterpillar offers you two new pace-setting machines in the DW20 Series E and the DW21 Series C and their matched scrapers with exclusive **LOWBOWL** design.

Everything about these high-speed, high-capacity rigs contributes to BIGGER production. The new **LOWBOWL** design of the scrapers utilizes tractor and pusher power at maximum efficiency. The result: bigger loads and faster loading times. Feature after feature, many of them described briefly here, add up to a new profit-making potential for users. Get the full facts from your Caterpillar Dealer.

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR*

*Both Cat and Caterpillar are registered trademarks—®

NEW DW20-DW21 —GIANT EARTHMOVERS

HOW LOWBOWL DESIGN PAYS OFF IN BIGGER, FASTER PAYLOADS

New No. 470 Scraper with ***LOWBOWL*** *design*

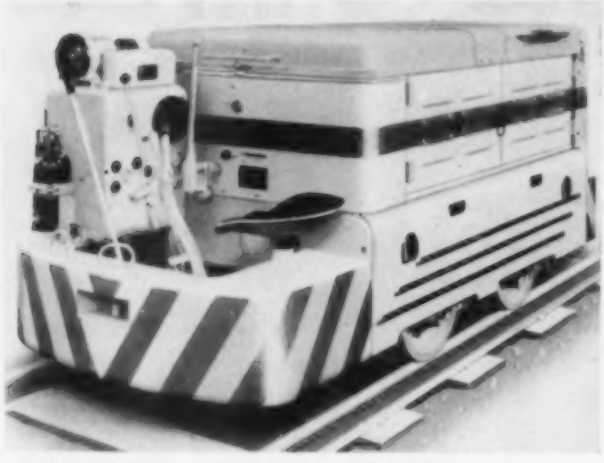
Both scrapers were loaded with the same material obtained under identical conditions. Result: in the No. 470 a net load weighing 5000 pounds greater than the load in the No. 21—a profitable margin for **LOWBOWL** design!

Both No. 470 and No. 456 feature this new concept. The bowl has been widened and lengthened, yet bowl depth has been lowered. Horsepower is utilized more efficiently. Material is loaded with less resistance clear out to the end of the loading cycle. Result: faster loading for **LOWBOWL** design!

Sideboarded No. 21 Scraper

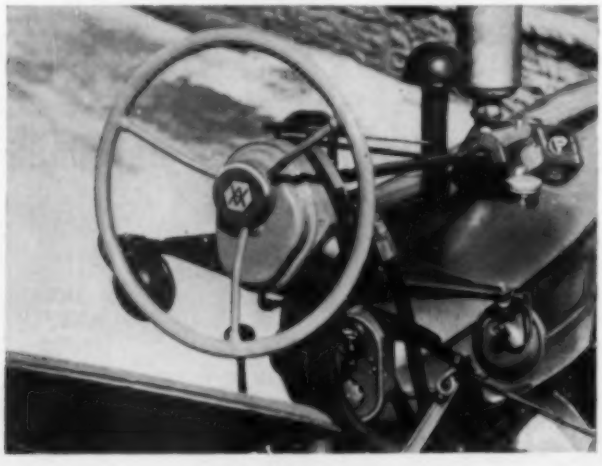
ANOTHER EXAMPLE OF CATERPILLAR LEADERSHIP IN ACTION

EQUIPMENT NEWS



Permissible Diesel for Underground

Newly announced Plymouth line of "Mine-O-Motive" mine locomotives, offered in 5- to 10-ton units, includes a permissible model fully tested and approved by the USBM under Schedule 22 for underground operation in coal mines. Other models have been operating in non-gaseous mines for years, the company reports. Scrubbers and exhaust conditioners are offered on all Mine-O-Motive models, along with diesel-torque converter drive, and a 2-ton trammer is to be available later. Included in the company's line are models from 3 to 70 tons, with gasoline or diesel power, mechanical or torque-converter drive, and diesel-electrics from 25 to 50 tons. Full details from Plymouth Locomotive Works, Div. of Fate-Root-Heath Co., Plymouth, Ohio.

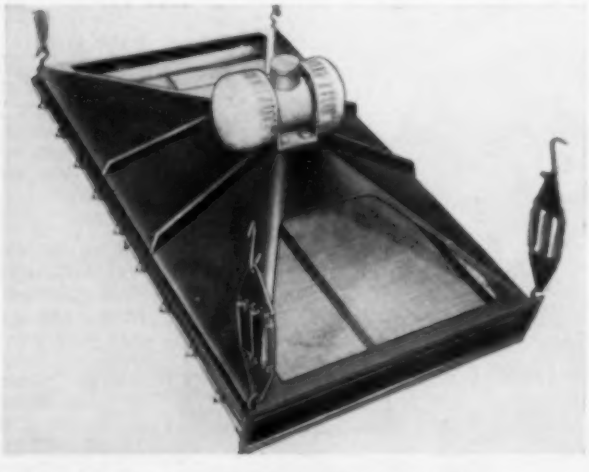


Power Steering Quickly Added To Off-Highway Vehicles

A new hydraulic power steering device, designed to reduce the back-breaking job of steering such vehicles as tractors, loaders, graders, hi-lift trucks, etc., to one-finger control, has been introduced by Westinghouse Air Brake Co., Industrial Products Div., Wilmerding, Pa., which will produce and market the device under an agreement with Dunbar Kapple, Inc. Designed to eliminate driver fatigue because no shock or backlash is transmitted to the wheel, the small special device can be installed in 2 or 3 hr on virtually all existing vehicles without structural changes in the vehicles. Permitting full-power 360-deg steering, the Westinghouse power steering unit contains a top power limit to insure that existing steering mechanisms are not damaged, a feature that makes it so readily adaptable to present equipment, the maker says. It gets its power from a small hydraulic pump, attached to either the generator or distributor.

New Design for Tractor-Shovels

The Frank G. Hough Co., 735 Seventh St., Libertyville, Ill., has announced the addition of two entirely different four-wheel-drive models to its line of "Payloader" tractor-shovels, the Model HU with a 1-yd heaped capacity and the 1½-yd Model HH. An outstanding exclusive feature is a design which permits 40 deg of bucket "breakout" at ground level rather than at a 3- or 4-ft "carry" position, according to the company. Also for maximum loads with a minimum of effort, a powerful "pry-out" action is obtained by using breakout pads on the ground as a fulcrum for leverage, it is said. Other features cited include a combination of underslung boom-arm design and positioning that provides complete driver visibility and safety; more horsepower and weight in relation to bucket capacity; sealed, pressurized hydraulic systems; torque converters and full-reversing transmissions; double-acting hydraulic rams with chrome-plated piston rods; and hydraulic brakes and power steering. Full details from Hough.



Vibrator Offers Fast, Uniform Sizing

The new Syntron-Sinex suspension-mounted vibrating screen designed for fast, uniform sizing is available in single- and

wheel it where you want it

. . . the RBD-30 Permissible Roof Bolting Unit does the rest! And in less than 3 minutes time . . . that's all it takes the RBD-30 to complete an entire roof-bolting cycle from drilling hole to setting expansion bolt. Where hole depth is less than 36″ it's even faster . . . completes the entire cycle in 1½ minutes flat.

Just look at these design features that add to the RBD-30's operation ease and efficiency: (1) low over-all height and portability for easy access and operation in low ceiling areas; (2) telescopic chuck permits 6″ auger adjustment to meet roof height variations; (3) built-in slip clutches protect the drill and bolt-setting motor . . . prevent stalling; (4) available with water swivel attachment, special low speed spindle adapter for slow speed drilling and a low seam drilling attachment for low coal areas.

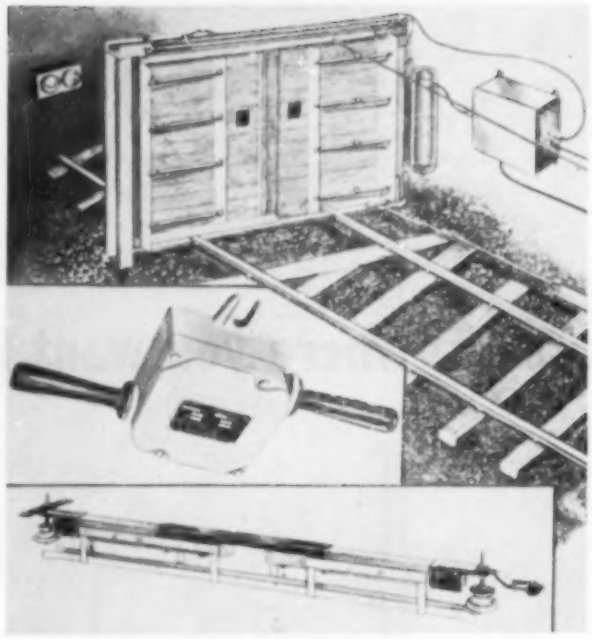
Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

double-deck models, in open or totally enclosed types. The vibrating unit is a totally enclosed, pressure-tight, waterproof, permanently lubricated electric motor with unbalanced weights on the shaft. The screen area is vibrated at 3,600 per minute, with an amplitude of 3/16 in. Available with various screening, the unit offers increased screen life through use of four-way tensioning for better load distribution, the company says. Full details from the Syntron Co., 975 Lexington Ave., Homer City, Pa.

Automatic Air-Powered Mine Door

One of the new products being introduced by the American Mine Door Co. during its Golden Anniversary year is its new Type P "Air-Power" mine door developed for installation where a regular mechanically operated door is impractical. Possible applications cited by the company include location on a curve where sufficient length of straight track is not available for the mechanism required to open a mechanical door, or in watery or muddy area that would inhibit the mechanical action of its standard Type Z door. Offering positive, automatic action, the air-actuated unit is available in two types and features an overhead location for all working parts for longer, trouble-free service. Bulletin with full details from American Mine Door Co., Canton 6, Ohio.



Blasthole Unit Offers Three Drill Types

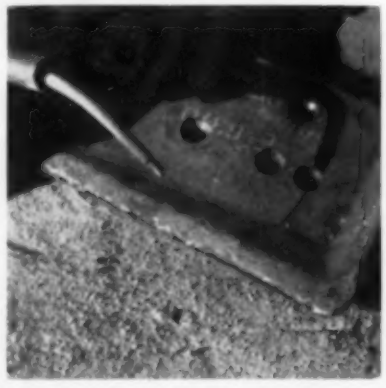
The new Ingersoll-Rand "Triple Duty Drillmaster" is a self-contained drilling unit designed to speed up rock drilling and provide a range of hole sizes and drilling depths heretofore not available in a blasthole drill, the maker says. To suit individual operating conditions, the Drillmaster offers three combinations or methods of drilling, as follows: utilizing the new "Depth-Master" or "down the hole" drill for deep blastholes up to 6 in in diameter; with the "Power-Master," a new heavy-duty hammer drill for 4½-in holes; or with the "Roto-Master" rotary drill for rotary drilling of holes up to 6¼ in. Other features cited by the company include a well-engineered easily lowered tower providing long steel changes; positive chain feed; a dust collector; 600-cfm rotary compressor; motor-driven crawler assembly; and "out in front" full-vision drilling. Tower and drills are available for mounting by users on trucks or tractors. Form 4164 with full details from Ingersoll-Rand, 11 Broadway, New York.

DIESEL ENGINE LINE HAS SIMPLIFIED FUEL SYSTEM

An entirely new fuel system designed around the Roosa-Master pump is now standard equipment on all diesel engines produced by Harnischfeger Corp., Crystal Lake, Ill. Especially engineered for P&H diesel engines, the new fuel system does away with a total of 131 separate parts and is 49.5 lb lighter in weight. It is far easier to understand, requires greatly less maintenance than the former system, and offers easier starting, improved engine torque characteristics and greater operating economy. Described as a single-cylinder, opposed-plunger, inlet-metering, distributor-type pump, it is a sealed and fully self-contained unit. It incorporates a built-in vane-type fuel transfer pump, governor, injection rotor with plungers and metering valve and distributor head. The pump is self-lubricating and has no ball bearings, operating valves or gears. It has the same number of parts for each P&H model, two through six cylinders. Bulletin Z-15 with details from Harnischfeger.

COMPLETE PILOT PLANT

Complete pilot plant for mills and processing plants has been introduced by Denver Equipment Co., Box 5268, Denver 17, Colo. The unit consists of crusher, ball mill, classifier, pumps, conditioner, flotation machine and table, and is flexible so that other elements of crushing, grinding, screening and concentration may be included later as required. A bulletin describing typical continuous test plant layout with additional data on Denver continuous pilot plant equipment is offered by the company.



NEW HIGH-SPEED HARDFACING

A new line of tubular-fabricated alloy wires designed for open-arc application through standard semiautomatic welders has just been announced by Stoody Co., Whittier, Calif. Essentially, this is a new process that requires no flux and offers the versatility of manual welding with the control of the full automatic. Depositing 7 to 15 lb of hard metal an hour, the "material-and-method" combination makes possible a welding speed two or three times that of the manual process, with considerable savings in labor, the company says. The first three materials to be offered in the line are a 50% high-chromium hardfacing alloy; a 20% alloy for hardfacing; and a Had-

B.F.Goodrich

125,000 MILES and 3 recaps cut tire costs at Colonial Coal Corp.

PITTSHAW Trucking Co. trucks are equipped 98% with BFG tires.

THESE TIRES have seen 1200 hours' service at Eagle-Picher mine.

CLINCHFIELD Corp. says Traction Express tires wear "almost indefinitely."

How these miners cut tire costs —and how you can, too!

THESE four mining companies—all in different parts of the country—have one thing in common: they're saving money through the outstandingly long service they get from B. F. Goodrich tires.

The Colonial Coal Co. in Kentucky reports 125,000 miles and 3 recaps from Universal tires. Clinchfield Coal Corp. in Virginia often got only 30 days' service from other makes of tires, reports B. F. Goodrich tires can be recapped. "BFG tires are better than any we've ever used," says Pittshaw Trucking Co., Pennsylvania coal hauler. And down in Oklahoma, the Mining & Smelting Division of Eagle-Picher Co. reports recaps give 75% of original mileage.

All-Nylon body

You can get money-saving service like this, too, particularly with B. F. Goodrich *all-nylon* tires. Nylon is stronger than ordinary cord materials, withstands double the impact, and resists heat blowouts and flex breaks. The B. F. Goodrich *all-nylon* tire body outwears even its extra-thick tread, can still be recapped over and over!

Your B. F. Goodrich retailer has a money-saving tire for every mining job. Call him today and start getting longer, trouble-free tire service. The address is listed under Tires in the Yellow Pages of your phone book. Or write *The B. F. Goodrich Co., Tire & Equipment Division, Akron 18, Ohio.*

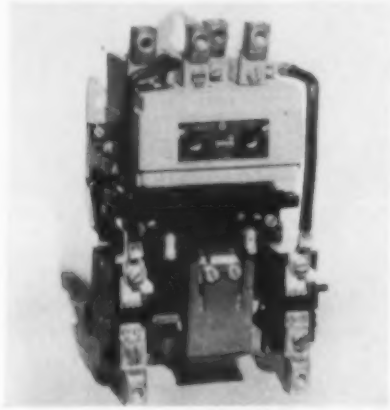
Specify B. F. Goodrich tires when ordering new equipment

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

field nickel manganese for build-up of manganese steel parts. Details from Stoody.

EXPLOSIONPROOF FLASHLIGHT

Automatic circuit cut-off to prevent fire or explosion is provided by a plastic reflector assembly featured in new line of safety flashlights by Eveready. Safety features are built about two phenolic parts compression and plunger molded by Auburn Button Works Inc., Auburn, N. Y. If the bulb is broken, the electrical circuit is opened instantly before the exposed filament can ignite inflammable or explosive mixtures of gas in the surrounding atmosphere. USBM has approved the assembly for use in methane-and-air mixtures and the flashlight also carries UL approval for Class I, Groups C and D service. More details from Auburn Button Works.



STARTER 40% SMALLER

A new NEMA Size 4 vertical lift magnetic starter, 40% smaller than previous models of the same size, has been announced by the General Electric Co., Schenectady 5, N. Y. Designed for motors of up to 100-hp rating, the new starter is the same size and has the same mounting dimensions as the Size 3 model. Features cited by the company include a tough cast-on plastic case for maximum protection of coil windings; a permanent air gap causing the starter to drop out when de-energized regardless of age and usage and a new type of bimetallic overload relay for overload protection. The unit is available in reversing, multispeed, and combination forms, with either vertical or horizontal mechanical interlocks.

CRAWLER DRILL RIG FOR ROUGH TERRAIN

Gardner-Denver Co., Quincy, Ill., has announced a new "Air Trac(R)" self-propelled drill carrier with crawler-type tracks, which the company reports has proven superior to the conventional wheel-mounted wagon drill carriage in operation on steep terrain and unusually rough and rocky drill sites. The Air Trac consists of a hydraulically actuated T-bar mounted on two self-propelled crawler treads, each powered by a G-D air motor, and is said to develop sufficient traction power to haul an 11,720-lb compressor up a 10% grade. The T-bar supports a G-D chain feed and rock drill. The unit's mobility permits spotting holes quickly and accurately and the exceptional stability of the T-bar increases drilling efficiency, especially in drilling long holes with G-D deep-hole drills, the company reports.

LONG-LIFE VIBRATOR FOR VARIED SCREEN SIZES

Availability of the Deister "Unitized Lifetime" vibrating mechanism for smaller-size vibrating screens has been announced by the Deister Machine Co., 1933 E. Wayne St., Ft. Wayne 4, Ind. Now available for Deister vibrating screens from 3x6 to 6x14 ft, the mechanism is a precision-constructed, jig-assembled unit, offering the longest possible wearing life, the company says. Renewable sleeves between the outer race of the spherical roller bearings and the bearing housings prevent wear on the housings themselves, while shaft wear also is prevented by renewable sleeves between the shaft and the inner race. After long service, the original close "factory-tolerances" can be easily restored by replacing the sleeves and bearings. The vibrating mechanism itself is demountable and readily interchanged as a unit. More details from company.

SHOVEL ADAPTABLE FOR STOCKPILE LOADING

New "Excaloder" loading attachment adapts the new Link-Belt Speeder heavy duty LS-98 1-yd shovel-crane for horizontal, straight-line loading operations. The Excaloder is operated by the LS-98 Speed-o-Matic controls, which provide fingertip control of all functions, with fast and positive response. Use of straight-line bucket action, during crowding or retracting, makes the Excaloder particularly valuable for grading and cleanup or loading from stockpiles, the maker reports. Bulletin with details from Link-Belt Speeder Corp., Cedar Rapids, Iowa.

BEARING CUTS INSTALLATION

A two-bolt flange ball-bearing unit being marketed by the Sealmaster Div., Stephens-Adamson Mfg. Co., Aurora, Ill., is interchangeable with the Sealmaster four-bolt flange units on the diagonal bolthole dimension and is available in shaft sizes from ½ to 2 3/16 in. The two-bolt flange unit retains all of the Sealmaster patented design features and on new installations eliminates two fasteners as well as punching or drilling for two holes. In addition, it cuts installation costs and permits closer bearing spacing on multiple shaft installations, it is said. As a replacement bearing, the new unit fits the diagonal bolt centers on present four-bolt units and carries the same load rating for a given shaft. Bulletin SS-125 from Stephens-Adamson.

DIAPHRAGM VALVE FOR SLURRIES, CORROSIVES

A new "Koroseal" diaphragm valve, first ever made of rigid Koroseal, has been announced by the B. F. Goodrich Co., Industrial Products Div., Akron, Ohio. Of simple straightway design, the valve is recommended for handling slurries, fluids, gases and corrosive mate-

We put our best men on your toughest problems

A staff of expert Amoco mine lubrication engineers are glad to help you solve your toughest lube problems. From long experience they know exactly which proven Amoco lubricants to recommend. And you can be sure each piece of your expensive, hard-working machinery will get the best protection possible.

Amoco service that meets your individual requirements—wherever and whenever they arise—is like having your own engineer supervising and getting the most out of every drum of lubricant you use . . . another good reason to make it Amoco, *all the way!*

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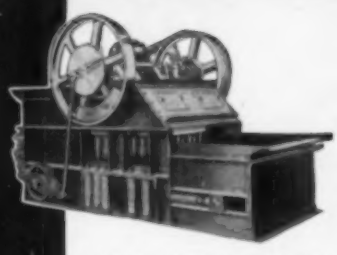
. . . SAFE • SURE FOR MINE MACHINERY

AMERICAN OIL COMPANY • NEW YORK

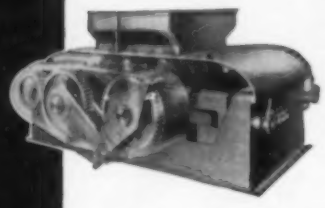
America's most complete line of CRUSHING EQUIPMENT

AVAILABLE
FROM STOCK
AND ON SHORT DELIVERY



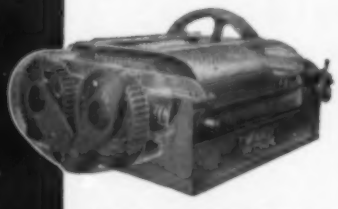
McNally Norton Vertical Pick Breaker

50% less fines when reducing lump to egg and stove sizes.



McNally Double Roll Gearmatic R. O. M. Breaker

Built in tonnage ranges from 750 tph to 1400 tph. Full floating Gearmatic drive.



McNally Gearmatic Stoker Coal Crusher

This unit offers three prime advantages:
High volume production, plus accurate sizing, plus low percentage of fines.

McNally Single Roll Crusher

Universal application. 20", 24" and 36" dia. rolls.

For immediate action on complete information write, wire or call . . .

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★ Pittsburg, Kansas ★
★ Wellston, Ohio ★

rials at temperatures to 150 F and pressures to 150 psi. According to the company, the valve works like a simple pinch clamp and is closed by pressing a flexible diaphragm against the raised bottom which is curved to fit the diaphragm. When fully closed, the diaphragm is seated under pressure providing a cushioned leakproof seal. The absence of pockets, corners, grooves and sharp changes in direction of flow makes the valve self-cleaning. The new valve does not require packing because the diaphragm seals off the valve stem and working parts from the solutions, which also eliminates leakage or waste of materials, the maker says. It is available in the six sizes from ½ to 2 in.

FREE BULLETINS AVAILABLE

ROOF-BOLTS—Booklet 569 describing Republic Steel's mine roof bolts explains the six major advantages of Republic's new forged-steel wedge nut and forged-steel rigid shell assembly, said to be the only forged nut-and-shell assembly made. It also includes data on other Republic roof bolts, shells and roof-bolt plates. Republic Steel Corp., Adv. Div., 3100 E. 45th St., Cleveland 27, Ohio.

DC MOTORS—New General Electric DC explosionproof mine motors, ½ to 60 hp, for any underground mining application, are discussed in Bulletin GEA 5553. Design, construction, application, ratings and dimensions are covered in detail. General Electric Co., Schenectady 5, N. Y.

TROLLEY LOCOMOTIVES — 16-p Catalog G-102 provides detailed data on the design, specifications and operation of the Goodman line of trolley locomotives for mainline haulage in coal mines. Eight models from 11 to 20 tons are covered. Goodman Mfg. Co., Halstead St. & 48th Pl., Chicago 9.

BLASTING CAPS—16-p booklet offered by the Explosives Dept., American Cyanamid Co., 30 Rockefeller Plaza, New York 20, contains full data on the American line of electric blasting caps, blasting machines and accessories. Blasting considerations, procedures, shooting patterns are discussed in detail.

HEADGEAR—MSA Bulletin 0600-3 discusses the complete line of Skullgard protective helmets developed for industrial workers and miners, and along with descriptions of reinforced and high-pressure plastic headgear covers hats made of glass fiber and aluminum. From Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.

CYCLONE CLASSIFIERS — Dorr-Oliver, Inc., Barry Pl., Stamford, Conn., offers new bulletins describing the development, physical characteristics, capacities and ranges of separation of two new classification units. Bulletin 2503 covers the "FR DorrClone" with fixed-feed opening and variable vortex finders and apex openings, developed as a low-cost, rubber-lined wet cyclone with replaceable parts and available in three standard sizes, 6, 12 and 24 in. in diameter. Bulletin 2504 discusses the "M DorrClone," which consists of molded rubber block cyclones, either 30 or 50 mm in diameter, installed in a common housing and available in various combinations for separations in the 10 to 20 micron range and capacities from 70 to 170 gpm.

DIAMOND-DRILL BITS — Bulletin offers construction details, sizes and prices on DTR line of diamond drill bits, including coring, casing, casing shoe, concave, pilot and impregnated coring bits, reaming shells, etc. From Diamond Tool Research Co., Inc., 380 Second Ave., New York 10.

ELECTRICAL CONNECTORS—12-p Bulletin B59 illustrates and describes Joy electrical plugs and receptacles for industrial power-connecting requirements, covering all standard, as well as many special industrial, needs. Joy Mfg. Co., Dept. J-40, Oliver Bldg., Pittsburgh 22.

TRACTORS—A 30-p booklet, "What's New in International Crawler Tractors and Equipment," lists recent improvement made in International TD-24, TD-18A, TD-14A, TD-9, T9, TD-6 and T-6 crawlers. It also covers the new TD-24 torque-convertor diesel crawler and various attachments and accessories. Consumer Relations Dept., International Harvester Co., 180 N. Michigan Ave., Chicago 1.

HYDRAULIC PUMPS—The New York Air Brake Co., 1100 E. 22nd St., Cleveland 17, Ohio, offers new Bulletin DP-320 describing its new Series PFM-100 dual-vane hydraulic pumps designed expressly to meet the special conditions of service encountered on mobile equipment applications. The PFM-100 pump is designed for high-speed direct engine drive, and can be operated continuously at 2,000 psi and at maximum speeds from 2,000 to 2,600 rpm, depending upon pump size.

POWER-TRANSMISSION — W. A. Jones Foundry & Machine Co., 4401 W. Roosevelt Rd., Chicago 24, offers a new series of bi-monthly publications devoted to the application of power-transmission equipment to meet today's industrial needs. The first issue, "Better Drives," deals with drives for heavy-duty belt conveyors. Succeeding issues will discuss drives of other types, their advantages and application.

PUMPS — Model C-3 supporting adapter "Electrifugal" pumps are described in Bulletin 52B6083C released by Allis-Chalmers Mfg. Co., 968 S. 70th St., Milwaukee 1, Wis. The units are available in capacities to 2,500 gpm, heads to 400 ft and temperatures to 250 F, in various types.

TRUCK DRIVES—Bulletin 550301 offers the full story on the Marmon-Her-

ROEPRENE PG and PCG CABLES

(Power Ground and Power Control Ground Cable)

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- *THE EFFICIENCY AND INSTALLATION ECONOMY OF GENERAL-USE CABLE THAT CARRIES ELECTRICITY FOR POWER AND HAS BUILT-IN PILOT CONTROL AND GROUNDING CONDUCTORS FOR INCREASED SAFETY,*

PLUS

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- *COLOR CODING FOR PHASE IDENTIFICATION;*
- *THE OUTSTANDING TOUGHNESS AND DURABILITY OF ROEPRENE OUTER JACKETS...*

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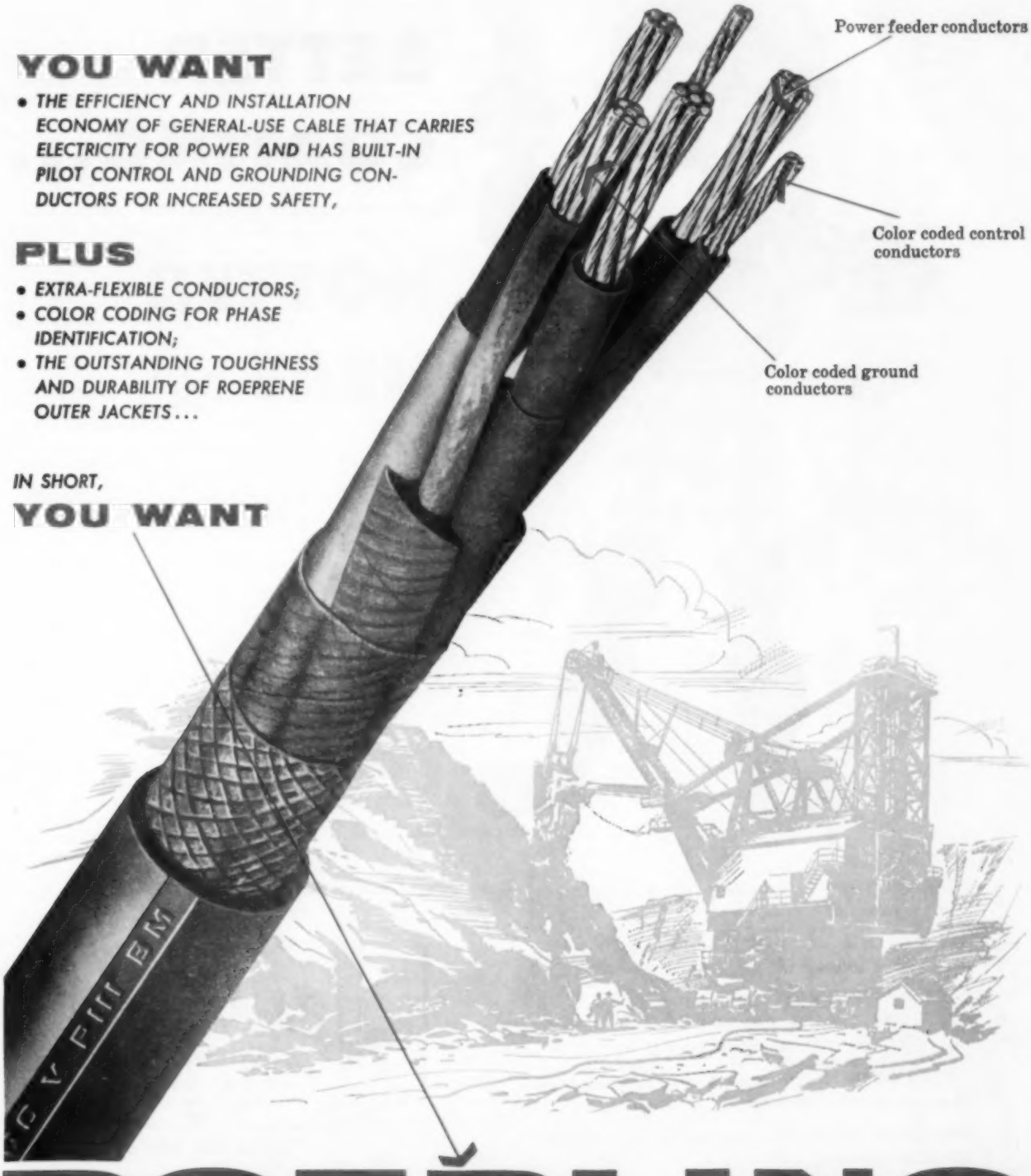

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Ashland, Kentucky

Special Advisory Service available from nationally recognized authorities on coal treatment.

rington "All-Wheel-Drive" Ford line, available in over 80 models for units up to 40,000 lb, gvw, and engines up to 170 hp. From Marmon-Herrington Co., Inc., 1519 W. Washington St., Indianapolis, Ind.

SHOVEL-CRANES — Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio, offers descriptive bulletins covering the Lima Type 34 and 44 power shovels, cranes, draglines and pull shovels on both crawler and wheel mounts. Type 34 is a ¾-yd shovel and 20-ton crane; Type 44, a 1-yd shovel and 25-ton crane.

AIR-COOLED COMPRESSOR—Bulletin 1540 describes I-R Model 20T air-cooled 20-hp compressor that may be either direct-connected or belt-driven. The new model features the I-R "Channel Valve" which has proven its worth in compressors of up to 4,000 hp, the maker says. Ingersoll-Rand Co., 11 Broadway, New York 4.

DRY-TYPE TRANSFORMERS—Bulletin 61B8222 describes A-C totally- enclosed dry-type transformers with NEMA Group 3 class insulation for indoor or outdoor applications, designed for higher temperatures to keep weights and dimensions as low as possible. Allis-Chalmers Mfg. Co., 968 S. 70th St., Milwaukee 1, Wis.

HIGH-HEAD PUMPS—Bulletin C-1054 provides full data on Wheeler-Economy two-stage Type DMD pumps designed for application where head requirements exceed single-stage pump capabilities; available in sizes from 2- to 10-in discharge for capacities to 4,000 gpm and heads to 750 ft. C. H. Wheeler Mfg. Co., Economy Pumps Div., 19th & Lehigh, Philadelphia 32.

TUNNEL BORER — Catalog G-110 from Goodman Mfg. Co., Halstead St. & 48th Pl., Chicago 9, describes the design and application of custom-built tunnel-boring machines for tunneling without explosives, as used in CW&F's Orient No. 3 mine and on various construction projects.

FEEDERS—Bulletin F-5 describes the Fuller line of roll and vane-type feeders and rotary valves, built of cast iron or iron and steel combinations and designed to handle coal and other dry pulverized and granular materials. Full specification and design data are included. From the Fuller Co., Catasauqua, Pa.

MAGNETIC DRUM SEPARATOR—The newly announced Stearns "WPD" Model "M" permanent magnetic drum separator designed to provide efficient recovery of magnetic media used in heavy-density separation plants is described in Bulletin 87 from Stearns Magnetic, Inc., Milwaukee 46, Wis. The separator is so designed as to produce a thickened magnetic concentrate of sufficiently high specific gravity to be reintroduced into the heavy-media vessel.

CABLE VULCANIZERS—New 16-p Bulletin B48a on Joy cable vulcanizers and vulcanizing supplies covers the latest equipment for patching and repairing jacketing on rubber, rubber-synthetic and polyvinyl-chloride (plastic) cable. Also included are useful data on molds v. cable sizes, and vulcanizing procedures. From Joy Mfg. Co., Dept. J-13, Oliver Bldg., Pittsburgh 22.

COMPRESSORS—A-C two-stage sliding-vane-type compressors for shop air, gas handling, drilling, etc., are covered in Bulletin 16B8244. Built in various sizes to deliver air at pressures from 60 to 125 lb, the units are designed for low maintenance and constant efficiency. Allis-Chalmers Mfg. Co., 968 S. 70th St., Milwaukee 1, Wis.

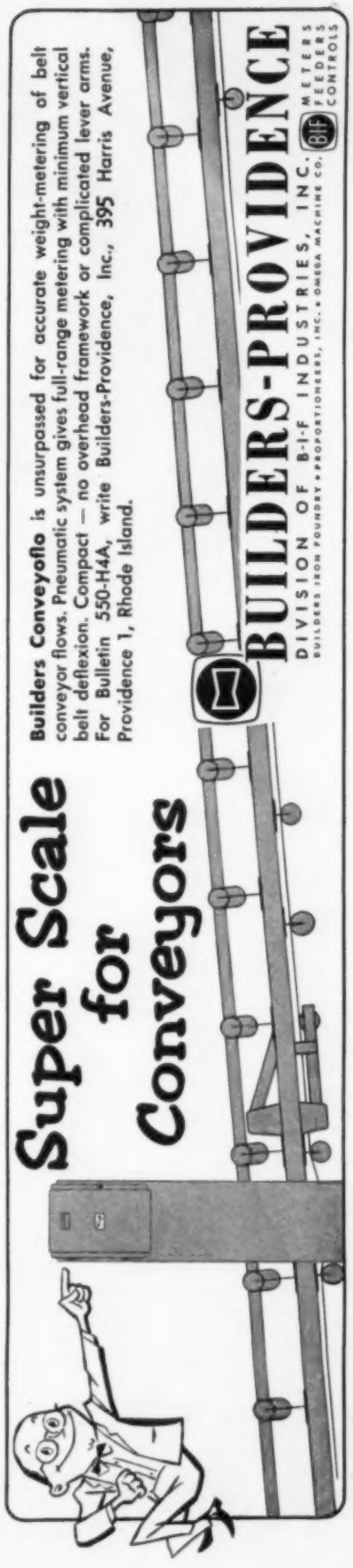
WIRE AND CABLE—Silicone rubber-insulated high-temperature wires and cables are described in a new Booklet 19-594 issued by General Electric Co.'s Wire and Cable Dept., Bridgeport 2, Conn. The new publication covers listings and specification data on power cable, control cable, appliance and fixture wires, apparatus and generator leads, and others. It outlines how the silicone insulation permits use of smaller conductor sizes for a given load and in some cases a reduction in the number of circuits.

POWER UNITS — Design, specifications and performance of four International power units are offered in separate bulletins from the Consumers Relations Dept., International Harvester Co., 180 N. Michigan Ave., Chicago 1, as follows: U-282 carbureted power unit, which runs on either gasoline or natural gas and develops 75.5 hp at 2,400 rpm; the U-164, a 4-cylinder valve-in-head gas or gasoline power unit, 36.5 hp at 1,800 rpm; UD-525 diesel power unit developing 115 hp at 1,800 rpm; and the UD-1091, the largest diesel model in International's line of 18 heavy-duty power units, a 6-cylinder valve-in-head engine that develops 190 hp at 1,400 rpm.

MATERIALS - HANDLING — Condensed Catalog 554, containing 50 p of technical data and brief descriptions of vibratory equipment, feeders, conveyors, power tools, shaft seals, diesel pile hammers, gasoline hammers, selenium rectifiers and other materials-handling equipment, is available from Syntron Co., 975 Lexington Ave., Homer City, Pa. Information is included on complete Syntron line.

TRACTOR-SHOVELS—The all-wheel-drive Michigan Model 175-A, with a 2¼-cu yd capacity, said to make it the biggest rubber-tired tractor-shovel available, and the smaller 1⅝-yd Model 125-A, are completely described in a new 12-p Catalog 1250-P offered by the Construction Machinery Div., Clark Equipment Co., Benton Harbor, Mich.

MAGNETIC BRAKES AND CLUTCHES—Stearns Magnetic, Inc., Milwaukee 46, Wis., offers new Bulletin 226-D covering its standard line of magnetic brakes and clutches. Providing more complete clutch and brake selection data, the bulletin includes specifications


Super Scale for Conveyors
Builders Conveyoflo is unsurpassed for accurate weight-metering of belt conveyor flows. Pneumatic system gives full-range metering with minimum vertical belt deflexion. Compact — no overhead framework or complicated lever arms. For Bulletin 550-H4A, write Builders-Providence, Inc., 395 Harris Avenue, Providence 1, Rhode Island.
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METERS
FEEDERS
CONTROLS

50 mm dia. rubber block cyclones at left ... double 30 mm dia. block at right.

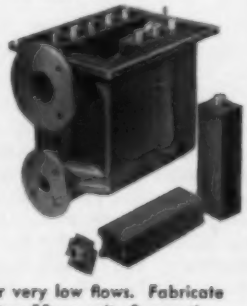
Multiple Molded Rubber Block Cyclones Make Sharp Separations in 10-20 Micron Range

Latest advance in wet cyclone design is the Type M DorrClone . . . developed for size separations in the 10 to 20 micron range. Designated as M-30 and M-50, this new design is now available with twenty 30 mm dia. rubber block cyclones or ten 50 mm cyclones in a common housing. Housings may be either cast stainless steel or bronze construction. When cover plate is bolted in place, each block is under compression to form a tight seal between feed, overflow and underflow chambers.

As with all cyclones, capacity and mesh of separation in the M DorrClone varies with the diameter of the individual units, operating pressure, feed solids concentration and specific gravity of the solids. On a slurry with a solids specific gravity of 2.7, the M-30 separates at 8-10 microns and the M-50 at 15-20 microns. As to capacity, the M-30 handles approximately 70 gpm at 20 psi, 100 gpm at 40 psi and 125 gpm at 60 psi. At these pressures the M-50 handles approximately 100 gpm, 140 gpm and 170 gpm. Top operating pressure for both is 125 psi.

For more information on this newest classification tool write for a copy of Bulletin No. 2504. Dorr-Oliver Incorporated, Stamford, Connecticut.

M-30 DorrClone completely assembled.



M-50 DorrClone completely assembled.

Lab units also available . . . for test units or very low flows. Fabricate stainless steel housing contains four 30 mm units or two 50 mm units. Separations are the same with equal diameter cyclones. Write for quotation.

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INCORPORATED
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of the companion new line of magnetic brakes for re-rated NEMA frame sizes.

VIBRATORS — Catalog 11 describes Cleveland Vibrator's complete line of electric vibrators, with specifications and prices on its silent eccentric-weight vibrators, electro-magnetic vibrators, vibrating tables and pneumatic vibrators. Cleveland Vibrator Co., 2828 Clinton Ave., Cleveland 13, Ohio.

CONVEYOR SYSTEMS — Jervis B. Webb Co., 8951 Alpine Ave., Detroit 4, Mich., offers new 12-p Catalog 455 describing its bulk conveyors for handling coal, ashes, sand, etc. Covered are specification and application data on belt, bucket, screw or apron systems, or combinations of them.

LIQUID STRAINERS—Brochure from S. P. Kinney Engineers, Inc., Box 445, Carnegie, Pa., provides detailed data on five types of strainers, including automatic, manual and twin-basket strainers. Designed to remove fine suspended particles from raw or process water, oil, gasoline and many other liquids, the strainers are available in pipe-line sizes ranging from 2 to 48 in.

TRACTOR-SHOVELS—Five catalog specification sheets covering the complete line of Austin Overshot loaders are offered by the Austin Div., Central Ohio Steel Products Co., Galion, Ohio. Described in separate sheets are Models 2-C, 4-C, 6-C, 7-C and 8-C, suitable for mounting on Caterpillar D2, D4, D6, D7 or D8 tractors, respectively, with capacities ranging from 1 to 4 cu yd.

FASTENING TECHNIQUES — New 52-p Ingersoll-Rand Catalog 5200-A is devoted entirely to the problem of running nuts, bolts, cap screws and other type fasteners, with actual case histories on reducing fastening costs and detailed data on its line of Air Impactools. The complete line of I-R air tools, universal electric Impactools, multicycle electric tools and other I-R products are illustrated and described. Ingersoll-Rand Co., 11 Broadway, New York 4.

HIGH-STRENGTH STEELS — Two new Republic Steel folders on high-strength steels include Form ADV-668 giving data, including chemical composition, mechanical properties, fabricating practice for cold forming, rolling limits and applications, on Republic "50" high-strength steel, formerly designated as Republic double-strength steel. The second, Form ADV-667, contains similar data on Republic "65" and Republic "70" high-strength alloy steels. Republic Steel Corp., Adv. Div., 3100 E. 45th St., Cleveland 27, Ohio.

STORAGE BATTERIES—C & D Batteries, Inc., Conshohocken, Pa., offers Bulletin CP-538/55 covering its new line of "Hi-Power" batteries for use in the control, switchgear, emergency lighting and auxiliary power fields; and Bulletin T-527/55 on its "PlastiCell" (high-tensile alloy grids) batteries for telephone application.

VARIABLE-SPEED SHEAVE — Stationary and motion-control "Vari-Pitch

Delivery from Stock in every coal mining area...

ROOF BITS

Firthite "Blue Bits" for roof drilling are made in 3 styles: RDL for light uses and very soft roof rocks; RDH with extra heavy duty insert to resist gage wear for most difficult roof drilling; RDS (slotted) for faster drilling of medium to hard roofs. All are water channeled for either wet or dry work.

DRILL BITS

Firthite "Blue Bits" for rotary drilling available in 3 styles:— D with either square or hex shank for use with any standard drilling equipment; DV (illustrated) for faster and easier hand held drilling.

MACHINE BITS

Firthite "Blue Bits" for mining machines include bit design, style and grade for every need from light to rugged condition on continuous mining equipment.

FIRTHITE "BLUE BIT" MINING TOOLS

Increased Distribution in Western Pennsylvania

Greater availability of Firthite "Blue Bits" from field stocks in Armstrong, Cambria, Clearfield, Indiana, Somerset and Westmoreland Counties has now been assured by the appointment of Mole-Bits Company, Johnstown, Pa., as an authorized Firthite "Blue Bit" distributor. All necessary grades, sizes and styles are stocked for immediate delivery . . . in roof bits, drill bits, machine bits and finger bits.

You can count on these rugged, dependable, proved-in-the-mine tools to reduce mining costs by minimizing down-time, provide maximum tool life and out-perform conventional tools in the toughest applications.

FINGER BITS

Firthite "Blue Bits" for use in standard drill heads feature two-surface brazing with tips set in recesses for greater strength. Available in all popular sizes.

Mr. Tooley says—

"Firthite 'Blue Bits' are better because Firth Sterling makes *both* steels and carbides. Tool steel shanks and Firthite Carbide inserts are perfectly matched by one manufacturing source for maximum quality."

Firth Sterling

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You know you'll sell more coal if you can give customers more btu's and less moisture. That doesn't have to mean new screening equipment – just order Bee-Zee Screens for your next replacements. They'll make you money.

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Electronically welded, Bee-Zee Screens are 100% stainless steel to fight abrasion – won't rust or corrode.

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BIXBY-ZIMMER Engineering Co.

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sheaves for speed variations up to 76% by means of pitch-diameter adjustment, capacities 1 to 600 hp, are described in Bulletin 20B6082C released by Allis-Chalmers Mfg. Co., 968 S. 70th St., Milwaukee 1, Wis.

TRACTOR-SHOVELS — New catalog covers the complete line of International Drott Skid-Shovels and attachments designed for use with the International T-6 or TD-6 crawler; the T-9 or TD-9; the TD-14A; and the TD-18A; with bucket capacities ranging from ⅜ to 3 yd. From Drott Mfg. Corp., Milwaukee 8, Wis.

WELDING—Air Reduction Sales Co., 60 E. 42nd St., New York 17, offers a new publication list briefly describing over 100 welding and cutting technical reprints, textbooks, safety booklets, slidefilms and movies available from the company.

CONTACTORS AND CONTROL RELAYS—A-C heavy-duty DC contactors, including new Type 522 units and control relays for steel mill and similar heavy industry applications, are described in a Bulletin 14B8171A from Allis-Chalmers Mfg. Co., 968 S. 70th St., Milwaukee 1, Wis. Available from 25 to 100 amp, 600 v maximum.

ENGINE CONTROLS—Bulletin No. 504S describes a complete line of speed-sensitive switch governors, featuring the governor flyweight principle used successfully in the company's overspeed governors first introduced in 1935 for overspeed protection of engines and other rotating machinery. From Synchro-Start Products, Inc., 8151 N. Ridgeway Ave., Skokie, Ill.

FUSES, OILERS—Catalog 55 contains complete descriptive data on all Trico electrical and lubricating devices, including sizes, general engineering data, ordering information, prices, etc. Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee 12, Wis.

FLOOR GRATING—A 16-p data and specification manual covering all types of grating, open steel floor armor, stair treads, vessel liners, bridge decking and drain grates is available from the Klemp Metal Grating Corp., 6605 S. Melvina Ave., Chicago 38. It contains safe load tables, panel width constant charts, tables on standard widths and types, etc.

ELECTRICAL INSULATION — New 12-p brochure entitled "Safe-T-Seal, A Dramatic Story," is offered by the Safe-T-Seal Div., MB Aircraft Services, 3100 Vanowen St., Burbank, Calif. It describes the many field usages of Safe-T-Seal, a chemical compound which is said by the maker to thoroughly impregnate any standard electrical insulation, fortifying it against premature disintegration because of humidity, moisture, extreme temperature changes or other external factors that normally shorten motor life. Two other booklets, "How to Make More Money," prepared for motor-rewind shops, and "How to Cut Maintenance Costs," will be included.

THE GREATEST NAME IN ELECTRICAL WIRE AND CABLE

resists all hazards far beyond accepted field requirements

SUPER SERVICE

Heavy Duty Mold-Cured Portable Cords and Cables

Constant research . . . both in our laboratories and in the field . . . keeps SUPER SERVICE ahead of your most severe applications.

Result: longer cable life, fewer work stoppages, and improved safety!

For example, the SUPERTUF neoprene jacket on new SUPER SERVICE resists sleeving, crushing, tearing, abrasion, oil and flame . . . specially reinforced for extra tensile strength.

New THERMAX heat-resistant insulation gives top protection against temporary current overloads.

Combined with extra features such as compact design to reduce sleeving of jacket from core . . . it's no wonder that SUPER SERVICE has become a byword for dependability.

In mining operations everywhere . . . day after day . . . SUPER SERVICE is keeping in check all the costliest hazards. Why settle for less? See your friendly General Cable Representative today!

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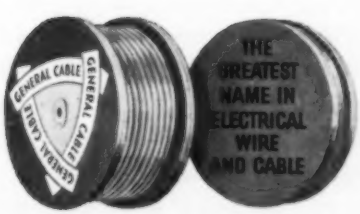

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TO AMERICAN BUSINESS...

Thanks for Taming a Wild Horse

This is a message of appreciation to American industry. The occasion for the message is the completion of our eighth annual McGraw-Hill Survey of Business' Plans for New Plants and Equipment.

To a considerable degree, our appreciation is personal. It goes to the companies whose cooperation made our survey possible. Twice as many companies as in any previous McGraw-Hill annual survey carefully answered our questions about their plans to invest in new producing facilities. They gave a great deal of expensive time to the job. The cooperation of these companies, which employ nearly eight million workers, put the results of our survey on the firmest footing, in terms of coverage, it has ever had. For this cooperation we are most grateful.

But our appreciation is much more than personal. It extends in even greater degree to the kind of planning of investment in new plants and equipment which our survey revealed. The nature of this planning holds out promise that American industry is on the way toward bringing under control what historically has been one of the most upsetting forces in the American economy—the violent fluctuations in business capital investment. Progress in ironing out these fluctuations gives occasion for public gratitude.

A full report of the results of the eighth annual McGraw-Hill Survey of Business' Plans for New Plants and Equipment will be sent to anyone requesting it from the Department of Economics, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, N. Y.

Very Good Business News

The part of our surveys that attracts the widest interest is the news they give about immediate business prospects. And this year the news is very good. The survey results indicate that American business as a whole plans to invest $29.5 billion in new plants and equipment this year. That is 5% more than was invested last year, and a new high for any year.

Plans for the years 1956-1958 are also remarkably encouraging in terms of the amount of investment in prospect. American business reports that it is already planning to spend within 3% as much for new plants and equipment in 1956 as in 1955. In the past, the expenditures planned for future years have always been sharply lower than those planned for the current year. This is understandable enough. It is sometimes impossible to anticipate all the expenditures that will be necessary a year or more hence. Thus the fact that plans are already made

to spend almost as much in 1956 as this year is very good news about business prospects. The level of investment now planned for the years 1957 and 1958 is also remarkably high—far higher than ever reported for years that far ahead in previous McGraw-Hill surveys.

Taking the Long View

The fact that these plans exist is of immense constructive significance. It clearly indicates that more and more, and now in dramatic degree, American business is taking the long view in making its plans for capital investment. It is developing a program which, if successfully carried out, will go far toward eliminating the habitual, destructive surging and sagging of what is in effect the central power house of our economic system—capital investment by business. Upon the level of this investment depends not only the general state of our prosperity but our progress in raising the American standard of living with new products and new and better industrial processes.

Seven years ago, when we first asked industry to estimate its capital spending beyond the current year, only a small minority of companies could give us any estimates at all. This year, 87% of the cooperating companies—and it was a far larger number of companies—could comply with our request for estimates for the years 1956-1958.

It Pays to Bet on Growth

A number of developments help explain the increase in long-range planning of capital investment. One is the increasing technical complexity of American industry. It often takes longer, in this complicated age, to work out a successful installation of new plants and equipment. Another reason for long-range planning is American business management's increasing conviction that it pays to bet on the demonstrated capacity of the American economy to grow over the long pull. With this goes a corresponding determination not to let short-term business fluctuations upset individual company plans for growth through addition of new plants and equipment. An additional factor, and one of great and increasing importance, is the sense of public responsibility on the part of American business leaders who want to help prevent destructive swings in the levels of new investment.

It cannot be too strongly emphasized that there is still nothing automatic about the carrying out of these long-range plans for business spending. Actual expenditures are still governed in major degree by the general health of our economy. This is fully attested by the fact that the current business recovery has led to a substantial upward revision of the investment plans reported to us last fall when we made a preliminary check of plans for 1955. Either private economic excesses or a reversal of the recent improvements in federal tax policy could gravely upset realization of present plans. Fortunately, neither of these possibilities seems to be an immediate threat.

The very fact, however, that American business management has made these plans and will do its utmost to carry them out is a development of tremendous constructive importance for the American economy. It means that major efforts are being made to tame what historically has been an economic wild horse—the process of capital investment by business. Both for doing it, and for telling us about it in our annual surveys, we extend to American industry our sincere thanks.

This message is one of a series prepared by the McGraw-Hill Department of Economics to help increase public knowledge and understanding of important nationwide developments that are of particular concern to the business and professional community served by our industrial and technical publications.

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Donald C. McGraw

PRESIDENT

McGRAW-HILL PUBLISHING COMPANY, INC.

COAL AGE

NEWS ROUND-UP

Peabody, Sinclair to Combine; Island Creek, Pond Creek Merge

MERGER PROPOSALS affecting several major bituminous producers were announced early last month. The Peabody Coal Co. reported June 6 that it had proposed acquisition of the Sinclair Coal Co. group of eight producing companies, a merger which, if completed, would make it the second largest bituminous company in the country. On June 7, it was announced that stockholders of the Island Creek Coal Co. and the Pond Creek Pocohantas Co. would vote Aug. 17 on a plan to merge the two companies.

In making the Peabody announcement, Otto Gressens, president, said that company directors had authorized filing of an registration certificate with the SEC for issuance of a maximum of 6,492,164 shares of stock in exchange for Sinclair stock and property. The arrangement is contingent on acceptance by the owners of at least 80% of the stock of the companies involved.

The Sinclair companies to be acquired are the Sentry Royalty, Power Coal, Homestead Coal, Sinclair Coal, Key Coal, Broken Aro Coal, Alston Coal and Sinclair Mines, Inc. The consolidated companies would have reserves of about 1,700,000,000 tons of "economically minable coal" and number 27 electric utility companies among their principal customers, according to reports.

The merger of Pond Creek into the Island Creek Coal Co. was announced by R. E. Salvati, president of both firms. The plan to be approved by stockholders calls for Island Creek to declare a 2½% stock dividend before the merger date and the conversion of each share of Pond Creek capital stock into two shares of Island Creek common. In addition, stockholders will be asked to approve an increase in Island Creek's authorized common stock from 2 to 3 million shares.

"A merger will contribute to the financial position and strength of the companies and will enable the combined organization resulting to take advantage of opportunities for additional profitable ventures which might not be available if the separate existences of the two companies are continued," Mr. Salvati said. "It will preserve in permanent form the benefits of the present joint management arrangement and is a concrete demonstration of our belief in the coal industry's future and its potential for growth."

Island Creek last year celebrated its 50th anniversary of mining, while Pond Creek started operation in 1923. For many years they have been closely associated through a joint management and selling arrangement. Together, they operate 12 mines in southern West Virginia and eastern Kentucky, with a present daily capacity of about 40,000 tons, and their combined 1955 production is expected to be well in excess of 9 million tons.

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Mine Fatalities Dip; Roof-Fall Deaths High

Coal-mine fatalities in the United States during May totaled 28, compared with 36 during May, 1954, according to tentative USBM figures reported June 16. The May fatality rate of 0.81 per million man-hours of exposure shows a marked improvement over May, 1954, when the rate was 1.26, but the record for the first 5 mo of 1955 cannot be called good, the announcement pointed out. From January through May, 173 men died in coal-mine accidents, compared with 171 during the corresponding period in 1954. The death rate per million man-hours so far in 1955 is only slightly better than that of the same period in the previous year, when fewer man-hours were worked, 1.03 compared with 1.05.

Of the 148 underground fatalities in the first 5 mo of this year, falling rock and coal caused 100 deaths, 81 at bituminous mines and 19 at anthracite mines. "The continued high rate of roof-fall fatalities gives further proof, if it is needed, that the seriousness of this menace cannot be overemphasized," said Bureau of Mines Director J. J. Forbes. "Bureau records show that both the number and rate of fatalities attributable to this cause were higher during the first 5 mo of 1955 than during the corresponding period last year."

USBM Dedicates New W. Va. Station

A NEW $2.6 MILLION APPALACHIAN EXPERIMENT STATION shown here at Morgantown, W. Va., was dedicated May 14 by the USBM. Work of the station will be devoted primarily to petroleum and natural-gas research, studies in the gasification of coal, and administration of the Federal Coal Mine Safety Act. The station consists of seven main buildings and has about 200 employees. Principal speaker at the dedication rites was Secretary of the Interior Douglas McKay. The buildings occupy a 45-acre tract deeded the government free by the Morgantown Community Association, a Chamber of Commerce subsidiary.

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News Briefs and Trends

Coal Held Economic Key to U. S. Aluminum Production

Studies of power sources for aluminum manufacture add up to the "inescapable" conclusion that coal is the economic answer when delivered costs are considered, Arthur F. Johnson, mining engineer, the Olin Mathieson Chemical Co., maintained recently in a paper presented before the AIME. "Coal should be considered as the logical new source of firm power for all major electro processes in the United States," Mr. Johnson said. Citing mines integrated with power and industrial plants as the key to low-cost power, Mr. Johnson said "it will pay all large power-consuming industries to study the economics of integrating their plants with power plants located at coal mines" when all the favorable factors are considered. Meanwhile, the Office of Defense Mobilization in Washington reported June 13 that the Olin Mathieson Chemical Co. had obtained a year's extension of a tax-easing certificate for the construction of an aluminum plant in West Virginia. The certificate, originally secured in 1952 and extended several times since, now reportedly calls for an expenditure of $74,056,390 to construct a coal-powered plant in the Ohio Valley with an annual output of 60,000 tons of primary aluminum.

Bituminous Continues Gains

Production of bituminous coal from Jan. 1 through June 18, 1955, totaled 207,856,000 tons, an increase of 18.7% over the same 1954 period, according to USBM figures released June 24. As it has since January, the industry continued in the last 4 wk of the period to widen the gap over the 1954 output. Thus, as of May 21, the 1955 tonnage was only 17.1% above the comparable 1954 output, compared to 18.7% on June 18. Bituminous produced during the week ending June 18, 1955, was estimated at 9,600,000. Relatively speaking, anthracite was at least holding its own. Production through June 18, 1955, was 11,566,000 tons, down 8.6% from the 1954 period, the same as on May 21, 4 wk earlier.

Westmoreland Opening Mine Planned for 100-Yr Operation

The Westmoreland Coal Co. last month was pushing to completion construction work on its new Hampton No. 3 mine, scheduled to go into production around mid-July. The new mine, opened by a 16½-deg slope 950 ft long, is near the company's Hampton No. 2 mine opened in 1950 (*Coal Age*, September, 1953) and the two properties, together with strip operations, have been designed to develop a 10,288-acre tract in Boone and Logan counties, W. Va., said to have an estimated 190 million tons of coal in several seams. The mine will be fully mechanized, with loading machines, shuttle cars and belt haulage, and coal will be prepared at the Hampton Mines plant now serving No. 2 mine. According to the reports, the company is looking forward to another 100 yr of operations through development of the area. Westmoreland Coal Co. celebrated its first 100 yr of operations during 1954.

Company Earnings Improve

The Peabody Coal Co., in its annual statement released May 31, reported a net income of $1,119,318 for the fiscal year ending April 30, 1955, compared with a net loss of $636,855 in the previous fiscal year. Coal sales for the 1955 year totaled $31,401,332, compared to $42,665,001 previously. The report attributed the improved earnings to a reduction in administrative and selling costs from $2,512,949 to $1,690,335, and operation of its properties at a higher degree of efficiency.

The Glen Alden Corp. has reported its net earnings during the first quarter of 1955 as $1,005,000, or 59c a share, as compared with $424,000, or 25c a share, in the first quarter of 1954. Depreciation and depletion charges in the 1955 quarter were $541,000, as compared to $586,000 in the first 3 mo of 1954.

Pennsylvania To Study Use Of Abandoned Strip Pits

Gov. Leader, of Pennsylvania, has named four state officials to study a plan to convert abandoned strip coal mines into lakes to be used for recreational purposes. In making the announcement, the Governor said the plan might lead to creation of new industry in the form of commercial fish ponds or farms and at the same time would eliminate abandoned strippings. Those named were Dr. Maurice K. Goddard, Secretary of Forests and Waters; John P. Robin, Commerce Secretary; Joseph T. Kennedy, Secretary of Mines; and C. A. French, executive director of the State Fish Commission.

Senate Bill Strengthens Water Pollution Control Act

The Senate has passed, with amendments, S. 890 extending and strengthening the Water Pollution Control Act and authorizing a 5-yr $10 million program of grants to states and interstate agencies to carry out its objectives. The bill emphasizes the responsibilities and rights of the states in preventing and controlling water pollution. Under its provisions federal participation would encourage cooperative activities by the states and state enactment of uniform laws, provide research and investigations by the U. S. Public Health Service, and assist various state, local, private and other agencies and institutions in the conduct of research and studies on the subject.

Anthracite Wins Over Oil for New Phila. Housing Projects

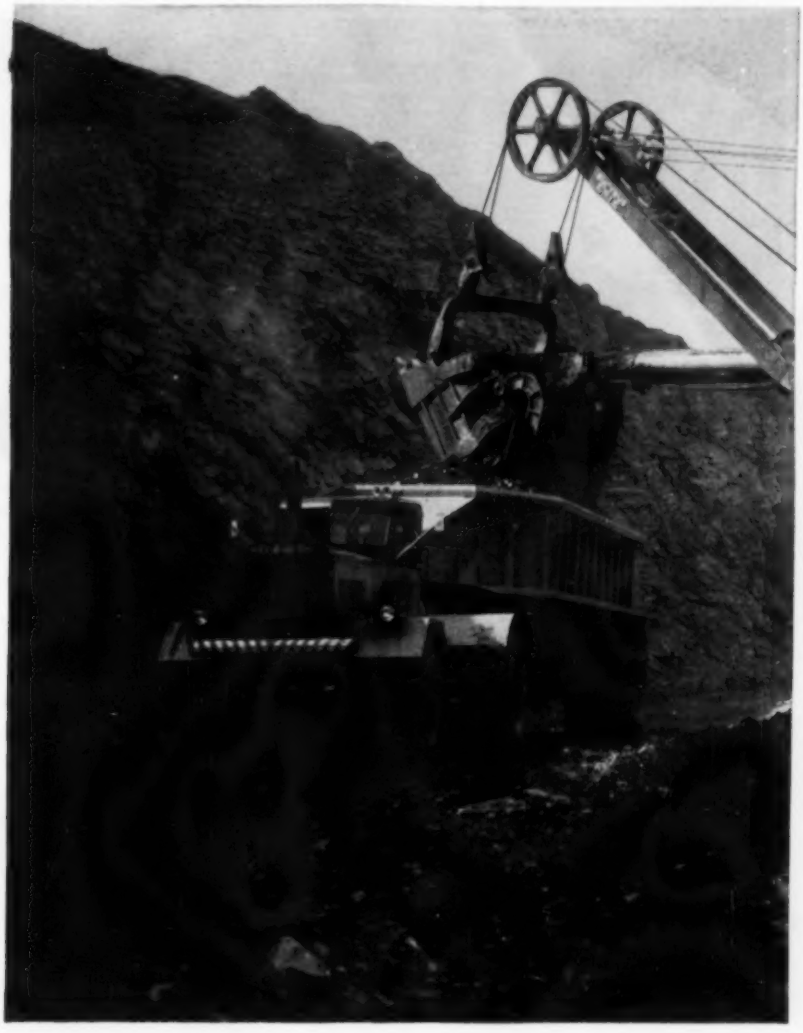
Three new housing projects will be equipped with new coal-fired equipment, the Philadelphia Housing Authority says, despite a previous declaration that it intended to convert to oil. Albert M. Cole, administrator of the Housing and Home Finance Agency in Washington, stated: "After considerable study of all phases of this problem, a decision has been reached to install new coal-fired equipment in all three projects." The result was a victory for Rep. Ivor D. Fenton (R., Pa.),who for 3 yr has waged a battle to have the projects utilize anthracite. Fuel oil interests and advocates maintained that conversion to oil would effect substantial annual savings.

New Colorado Plant to Process 8,520 Tons of Coal Daily

Ground-breaking ceremonies for an $11.5 million low-temperature coal-carbonization plant in Huerfano County, near Walsenburg, Colo., were witnessed by several thousand people, including Gov. Johnson of Colorado, June 18. The plant is being built on a 600-acre site granted to Cotarco, Inc., by the City of Walsenburg under a 99-yr lease. Stockpiling of coal on 400 acres of the site will start in about 4 mo. The plant is expected to use 8,520 tons daily and preliminary contact has been made with "more than 75" small mines in western Colorado and southern Wyoming to supply the plant, reported William J. Lollich, Cotarco operations manager. He also said the plant would use the Poindexter-Lowe carbonizer and "Low-Temperature Coal-Distillation Process," on which Cotarco holds exclusive rights. Reportedly, the plant will produce 5,930 tons of char product daily, 15 million cu ft of fuel gas, 6,400 gal light oil, 71,100 gal acid oil, 57,300 gal creosote oil, 72,000 gal pitch and 67 tons of sulphur.

Federal Agencies Charged With Ignoring Coal's Economies

Government officials responsible for switching from coal to other fuels for use in federal buildings last month were charged with "flaunting the White House energy report and ignoring recommendations to Congress." Rep. Augustine B. Kelley (D., Pa.) pointed to the Veterans Administration as "particularly guilty" of what he termed "irresponsible fuel purchasing policies." In a statement prepared for delivery on the floor of the House June 28, Congressman Kelley recalled that the recent report demanded the maintenance of a strong coal industry and recommended that federal agencies which consume large quantities of coal should consult the ODM before making a fuel purchase. "Despite the fact that the national welfare and security demand greater markets for coal, the tendency on the part of some government agencies is to favor natural gas or oil over coal even when the latter fuel would be more acceptable from an overall cost standpoint," Congressman Kelley said.



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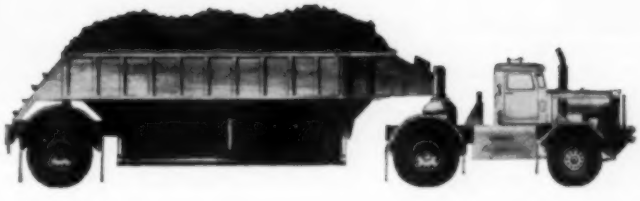

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HIGH-VOLTAGE SYSTEMS—T. R. Weichel (left), Okonite Co.; C. E. Plass, American Steel & Wire Div., U. S. Steel Corp.; F. J. Weis, Marion Power Shovel Co.; and David Stoetzel Jr., General Electric Co., were speakers. Session chairman, at left in right photo, was W. S. Welday, Ohio Power Co., shown with R. M. Leseney, Truax-Traer Coal Co., president-elect of the association.

Open Pit Mining Association, Electrical Div., takes a look ahead at . . .

Higher Voltage in Strip Mining

THE NEED FOR A CHANGE TO 6.9-KV SYSTEMS in powering the larger units either now in stripping or soon to come, and some of the factors to be considered in taking this step to higher-voltage transmission, were major themes at the 11th annual meeting of the electrical division of the Open Pit Mining Association, new Ohio Union Building on the campus at Ohio State University, Columbus, June 17.

Other features of the program were a tour of the plant of National Electric Coil Co., at Columbus; a talk and movie presentation on peacetime uses of atomic energy; a review of research activities at the engineering experiment station at Ohio State; and the association's banquet in the evening. Officers for the coming year were elected as follows:

President—**R. M. Leseney,** mechanical superintendent, Truax-Traer Coal Co., Canton, Ohio.

Vice president—**Howard Nunn,** chief electrician, Ken Coal Co., Beaver Dam, Ky.

Secretary-treasurer—**L. E. Briscoe,** electrical engineer, Ayrshire Collieries Corp., Indianapolis, Ind., re-elected.

The group of more than 100 electrical men paused in memory of E. E. Gaston, 1954-55 president of the association, who met an untimely death by electrocution Feb. 27, 1955, while engaged in his duties as electrical engineer, Hanna Coal Co., St. Clairsville, Ohio.

The morning session was devoted entirely to presentations on the use of higher voltage after the group had been welcomed to Ohio State by **Prof. Harold Bolz,** associate dean of engineering. **W. S. Welday,** manager, Eastern Div., Ohio Power Co., Steubenville, Ohio, presided. Technical speakers were **David Stoetzel Jr.,** applications engineer, General Electric Co., Schenectady N. Y.; **F. J. Weis,** chief electrical engineer, Marion Power Shovel Co., Marion, Ohio; **C. E. Plass,** electrical sales engineer, American Steel & Wire Co., Chicago, and **T. R. Weichel,** mining electrical engineer, Okonite Co., Wilkes-Barre, Pa.

OFFICERS AND SPEAKERS—Howard Nunn (left), Ken Coal Co., vice-president-elect; Mr. Leseney, the new president; B. L. Lloyd, Westinghouse Electric Corp.; Prof. Harold Bolz, Ohio State University; L. E. Briscoe, Ayrshire Collieries Corp., re-elected secretary-treasurer; and Prof. R. S. Green, Ohio State.

INDUSTRY MEETING— A Special COAL AGE Staff-Written Report

HIGHER VOLTAGE DESIRABLE FOR HIGH-CAPACITY SHOVELS

The increasing size of shovels and draglines used in modern stripping and the desirability and necessity of operating at greater distances from substations are significant trends in coal stripping, leading almost inevitably to the employment of higher voltage in power-distribution systems, Mr. Stoetzel said, in leading off on the No. 1 theme. Major benefits of such a change will be:

1. Motor-generator sets will develop maximum power under hard digging conditions, virtually eliminating pulling out of step and shutting down the operation.

2. The danger of burning out the AC drive motor as a result of continued operation at low voltage will be eliminated.

3. Auxiliary motors, lights and control

Continued on p 130

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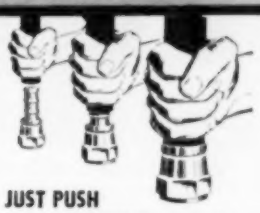

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MINING LAW, CONTINUOUS MINING—A. G. Gossard (left), Snow Hill Coal Corp.; J. W. Anstead, Linton Summit Coal Co.; and C. E. McWhorter, Goodman Mfg. Co.

COOPERATIVE SAFETY EFFORT—E. E. Quenon (left), USBM; H. T. Batman, Lynch Coal Operators'; Nathaniel Kirk, Snow Hill; C. A. Purcell, Indiana Bureau.

Indiana Institute Analyzes Progress

New Indiana mining laws, results of joint safety effort, prospects in coal sales, progress in continuous mining and qualifications required in today's supervisors discussed at Terre Haute.

PROMOTING SAFETY in Indiana's deep mines was a major feature of a varied program at the semi-annual meeting of the Indiana Coal Mining Institute at Terre Haute, Ind., June 11. Other program highlights were presentations on foremanship and its demands in today's industry; a review of provisions of the new Indiana mine law; developments in continuous mining; and the sales picture for Indiana coals.

Technical sessions were held morning and afternoon and the one-day meeting closed with an evening banquet. Alva S. Harris, general manager, Ingle Coal Corp., Elberfeld, Ind., and president of the institute, was in charge. Chairmen of the two technical sessions were John Stachura, general superintendent, Enoco Collieries, Inc., Bruceville, Ind., and J. W. Anstead, general superintendent, Linton Summit Coal Co., Terre Haute.

"Leadership comes from the heart and head, not from a sharp and wicked tongue."

Today's foreman must first of all be able to sell himself and his ability to his employer, then he must sell himself to his crew, David Ingle, Jr., president, Ingle Coal Corp., said in opening the meeting on the foremanship theme. He is responsible to many persons, including his superiors, his men and the inspectors. He must get along with all, yet it must be plain that he is still the boss, Mr. Ingle said. As helpful aids in developing leadership ability, he suggested that foremen adopt personal rules, as follows:

1. Explain your plans fully. Misunderstandings can create much trouble.
2. Never condemn anyone from hearsay.
3. Exercise good judgment, but never use anyone else's judgment as your own. Come to your own conclusions.
4. Remember that some so-called troublemakers may merely be men with enough courage to speak up for their rights.

Desirable traits shown by good foremen, Mr. Ingle said, include technical proficiency, decisiveness, humaneness, integrity and enthusiasm.

In formal discussion, Leonard Busiere, mine foreman, Green Valley mine, Snow Hill Coal Corp., Terre Haute, pointed out that truly qualified men are those who grow up with their jobs, making progress and learning new lessons with each increase in their responsibilities. One of the most important talents a boss can have, Mr. Busiere declared, is the ability to see and utilize the full capacities of each man in his crew.

Continuing the discussion on foremanship, Bert McCray, chief safety engineer, Enoco Collieries, Inc., noted that unit foremen should be selected for their ability to absorb teaching, among other attributes. Other desirable attitudes to be sought in foreman candidates include (1) patience, (2) genuine interest in safety, (3) reasonably good memory, (4) keen observation powers, (5) imagination, (6) complimentary approach to men and (7) loyalty to employer.

INDUSTRY MEETING—
A Special COAL AGE
Staff-Written Report

"One mistake in weighing, or billing, or handling a coal shipment can nullify months of hard work by a salesman."

In 1945, Indiana produced 25 million tons of coal and in 1954 only 13 million, William G. Stockton, director of sales, Indiana Div., Walter Bledsoe & Co., Terre Haute, reported in pointing out some of the difficulties facing the state's coal industry. Keen competition, not only from other fuels but from the coal communities of neighboring states, is the order of the day. Lower mining costs in West Kentucky, more favorable freight rates in Illinois, and greater possibilities for water shipments in both areas place Indiana operations at a disadvantage, Mr. Stockton said. The competition, however, forces improvement in Indiana's operations. It may develop, therefore, that efficient Indiana mines may participate to a growing degree in the expanding utility market and others, Mr. Stockton pointed out.

Reporting that Indiana's production in 1955 is about 10% ahead of the like period in 1954, Mr. Stockton held out hope for increased sales to (1) the cement industry which is spending millions of dollars in new plants in an effort to catch up with the demand for cement products, (2) the chemical industry which now takes more and more coal both for process

FOREMANSHIP, COAL SALES—Bert McCray (left), Enoco Collieries, Inc.; Leonard Busiere, Snow Hill Coal Corp.; J. A. Stachura, Enoco Collieries, Inc.; Alva S. Harris, Ingle Coal Corp.; and W. G. Stockton, Walter Bledsoe & Co.

steam and as a chemicals source and (3) "other industrials," also spending heavily for plant expansion and growing with the expanding national economy.

Final feature of the morning session was the presentation of Certificates of Honor from the Joseph A. Holmes Safety Association to three recipients, as follows:

1. Leonard Busiere, mine foreman, Green Valley Mine, Snow Hill Coal Corp., for supervising the production of 2,544,690 tons in 1,766,516 man-hr without a fatality.

2. Green Valley mine for achieving a record of no fatalities in the period from June 16, 1951, to December 31, 1954, and continuing, while producing 2,814,723 tons in 2,069,226 man-hr.

3. Viking mine, Viking Coal Corp., Terre Haute, for a record of no fatalities in the period from July, 1947, to January 31, 1955, and continuing, while producing 1,377,778 tons. This period covers the entire life of the mine, since the slope portal cut was started in July, 1947.

The awards were presented by E. E. Quenon, district health and safety supervisor, District E, U. S. Bureau of Mines, Vincennes, Ind.

"The 1955 Indiana mining laws are the result of co-operative effort . . . became effective in March, 1955."

Leading off in the afternoon session, A. G. Gossard, vice president and general manager, Snow Hill Coal Corp., reviewed the structure of the new Indiana mining law, pointing out that the recodification now closely agrees with federal statutes.

One of the main features, Mr. Gossard pointed out, is that the law creates a new Bureau of Mines and Mining within the state and establishes the office of Director of the bureau. The director and his inspectors are empowered with police powers to arrest violators of the law.

Applicable in all commercial deep mines in the state, the law calls for certification of shotfirers, a new requirement in Indiana. Other new features include:

1. Inspections must cover each shift, and reports of inspections must now be sent to district offices of UMWA and to the mine safety committee.

2. District officers and safety committees also will participate in investigation of all serious accidents and those resulting in fatalities.

3. Any mine showing 0.25% of explosive gas shall be classified as gassy.

The new law is specific in requiring compliance, Mr. Gossard declared in explaining that both management and men are held responsible.

"Safety is a combination of education and action. You must first have the idea, then push it through."

Like selling any product, safety promotion requires that a desire for safety be generated in all employees and supervisors, and that something constructive must be offered. This was the keynote sounded by Howard T. Batman, general manager, Lynch Coal Operators Reciprocal Association, Terre Haute, and moderator of a panel discussion on the Indiana Joint Safety Committee.

The results of the action of the co-operative safety effort show that the last underground fatality in an Indiana underground mine occurred in April, 1954. Previously, the average was a fatality per month, Mr. Batman said. A number of mines are showing excellent records in reducing their lost-time accident frequency. "This improvement is no accident," Mr. Batman concluded. "We are now establishing the best record in the nation."

On the subject of working habits, Nathaniel Kirk, general superintendent, Green Valley mine, declared that one of the most damaging fallacies is that a certain number of people must be hurt mining coal. Coal can be mined safely. Also, it is possible to fall into the habit of tolerating "a little bit of gas" in a place, or a "slightly bad" roof condition. This indicates a lack of proper training in supervisors. A foreman should demand strict compliance with accepted safety precedures, or he should not hold the job.

Make your haulage clearance as the track is installed, Mr. Kirk also advised. You seldom come back later to do it and lack of clearance is the greatest fault in haulage safety. Now that foremen in mechanized mines see their men more often, they can more closely supervise work habits. This closer supervision perhaps is one reason why Indiana mines produce up to 275,000 tons per compensable accident, Mr. Kirk said.

On training and Indiana performance, Mr. Quenon reported that 1,500 men have received the bureau's training in accident

Continued on p 154.

COAL MEN ON THE JOB . . .

Pocahontas Fuel Co. Itmann (W. Va.) Mine

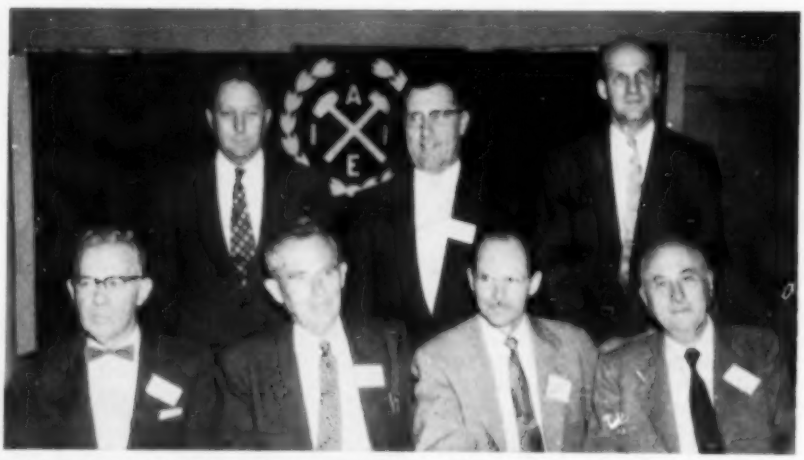
Officials shown during an accident-prevention class are: M. J. Hovanec, (left), inspector, USBM and one of the instructors; H. M. Runion, Perry H. Harris, Charles Fowler, P. P. Bryant, C. Blankenship, section foremen; one of the instructors; Clinton Marsh, lamphouse attendant; Claude R. Hall and A. J. Dempsey, section foremen.

BOLTING, BUMPS—F. M. Morris (left) Clinchfield Coal Corp.; J. William Bassett, West Kentucky Coal Co.; and Woods G. Talman, U. S. Steel Corp.

ROOF SHALES, AC POWER—Jack A. Simon (left), Illinois Geological Survey; E. E. Stacey, Enoco Collieries; and Rhesa M. Allen, French Coal Co.

Central Appalachian Section of AIME Canvasses Mining Developments

Production, roof support and safety are major topics of two-day technical and business meeting.



CONTINUOUS MINING, FLUORSPAR—Seated, George O. Tarleton (left), Consolidation Coal Co. (Ky.); C. S. Crouse, University of Kentucky; W. J. Skewes, Pocahontas Fuel Co.; Dr. A. A. Potter, Bituminous Coal Research, Inc.; standing, Carl Boone (left); J. S. Mathews, Compass Coal Co.; Harry J. Klepser, University of Tennessee.

CONTINUOUS MINING was the subject of two of five papers devoted to coal at the spring meeting of the Central Appalachian Sec., AIME, at the Phoenix Hotel, Lexington, Ky., June 10-11. Drilling to prevent coal bumps, studies of Illinois roof shales, and roof-bolt recovery were the other coal subjects. Fluorspar geology and mining in western Kentucky and southern Illinois was treated in a paper by Harry J. Klepser, professor of geology, University of Tennessee.

George O. Tarleton, president, Consolidation Coal Co. (Ky.), and chairman of the Central Appalachian Sec., opened the meeting and presided at a dinner at which Samuel M. Cassidy, vice president, Pittsburgh Consolidation Coal Co., was speaker. At a luncheon, with Daniel V. Terrel, dean of engineering, University of Kentucky, as master of ceremonies, Dr. A. A. Potter, president, Bituminous Coal Research, spoke on, "Research As a Protection to Coal's Future."

Session chairmen were: C. S. Crouse, head, Mining and Metallurgical Engineering, University of Kentucky; E. M. Spokes, professor, mining engineering, University of Kentucky; F. M. Morris, chief engineer, Clinchfield Coal Corp.; and Rhesa M. Allen, chief engineer, French Coal Co. W. J. Skewes, chief engineer, Pocahontas Fuel Co., was program chairman, and A. D. Sisk, chief, Kentucky Department of Mines & Minerals, was chairman of the arrangements committee.

Nineteen months of highly satisfactory electrical experience with three Jeffrey 76B 440-v AC Colmol continuous miners in Enoco Mine, Indiana No. 5 seam, Enoco Collieries Inc., Vincennes, Ind., was described in a paper by J. A. Stachura, general superintendent, and read by E. E. Stacey, maintenance foreman. This paper, presented at the American Mining Congress convention, was reported in *Coal Age*, June, p 83.

INDUSTRY MEETING—A Special COAL AGE Staff-Written Report

Compared to 275 v DC the use of 440 v AC has resulted in lower-cost electrical equipment, greater safety, a 50% lower cable cost, good face voltage at all times, and electrical repairs cut to a minor figure, said Mr. Stachura. The AC distribution diagram for Enoco appeared in *Coal Age*, August, 1954, p 88.

"Auger Drilling to Control Mountain

Continued on p 156

LONGER LINING LIFE

with Eaton Self-Contained Air Brakes

In exhaustive tests and actual truck operation, the Eaton self-contained air brake has proved that lining life is increased as much as 100 per cent. When necessary, relining service time is greatly reduced, cutting labor as much as two to four hours.

These important advantages are the result of a combination of Eaton advancements. Floating split-shoe design—using single pins at the anchor ends, with rollers and floating pins at the cam ends of the shoes—eliminates the need for anchor-pin lubrication, makes for quick action and quick release, and prevents pin seizure. Simply constructed with fewer parts, over-all weight is reduced approximately 15 per cent.

For a given input, greater braking effort is delivered at the drum. The strong rigid chamber bracket, mounted directly on the brake spider, entirely supports the short camshaft. Lubrication of the shaft is provided by a reservoir contained in the bracket. This compact, close-coupled design, with reduced bracket deflection, reduced camshaft wind-up, and shorter chamber stroke, assures quicker, safer truck stops.

PLUS

GREATER BRAKING EFFICIENCY

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QUICKER ACTION

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•

QUICK, EASY RELINE

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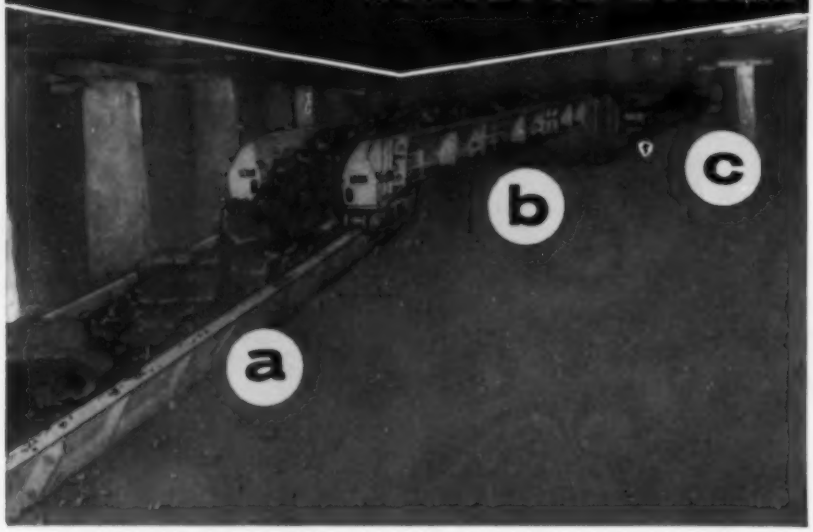
LOADS AND MOVES COAL FROM THE FACE
CONTINUOUSLY...
LONG PIGGYBACK®
CONVEYOR SYSTEM



AS SIMPLE AS...

a **LONG Model 88 Pigloader*** – the first loader designed specifically for Piggyback* Conveyor Mining—is a low-height, heavy-duty single motor machine capable of high-capacity operation. It automatically carries the receiving end of the Piggyback Conveyor along as it moves, loading into the Piggyback continuously. There are no costly delays waiting for "stop-and-go" transportation.

b **The LONG Piggyback Conveyor** – provides steady, uninterrupted haulage from the Pigloader to the LONG Room Conveyor. It rides freely back and forth (with movement of the Pigloader) on the pan line of the room conveyor. Wishbone pivots—one at each end of the Piggyback—make possible continuous operation at 90° angle breakthroughs.

c **The LONG Room Conveyor,** which receives coal from the Piggyback and moves it on to the gathering conveyor, has been especially designed for this continuous haulage system. Equipped with such exclusive LONG developments as rugged "Superflite" chain, extra strong flights and deep "whispering joint" pans, LONG Room Conveyors have proved their ability to handle the high tonnages of Piggyback mining. Further, they permit driving of extremely deep rooms.

With proved, practical Piggyback Conveyor mining, you can count on greater production, lower operating costs and increased profits. Six hours or more loading time per shift is not unusual, and the initial investment for the Piggyback system is surprisingly low.

*Trade Mark

For complete details or a demonstration, write us today!

The LONG Company
OAK HILL, W. VA.

Preparation Facilities

Freeman Coal Corp., CW&F Div., Orient No. 3 mine, Waltonville, Ill.—Contract closed with Jeffrey Mfg. Co, for 7-ft three-compartment 8-cell Jeffrey jig addition; to handle 5x$^{7}/_{16}$; capacity, 450 tph.

Kocher Coal Co., Valley View, Pa.—Shipment by Deister Concentrator Co. of one SuperDuty Diagonal-Deck coal-washing table for No. 4 buck anthracite and one Leahy Model E heavy-duty "No Blind" vibrating screen.

Jeddo Highland Coal Co., Jeddo, Pa.—Shipment by Deister Concentrator Co. of one SuperDuty Diagonal-Deck coal-washing table for anthracite barley.

Association Activities

Tobey Joins Indiana Group

The Indiana Coal Association has announced the appointment of Julian E. Tobey Jr. (above) as director of engineering, with headquarters at Terre Haute, Ind. In this position, Mr. Tobey will work toward the development of a broader market for Indiana coals through engineering advisory service to consumers and prospective users, and collaboration with consulting engineers, architects and equipment manufacturers.

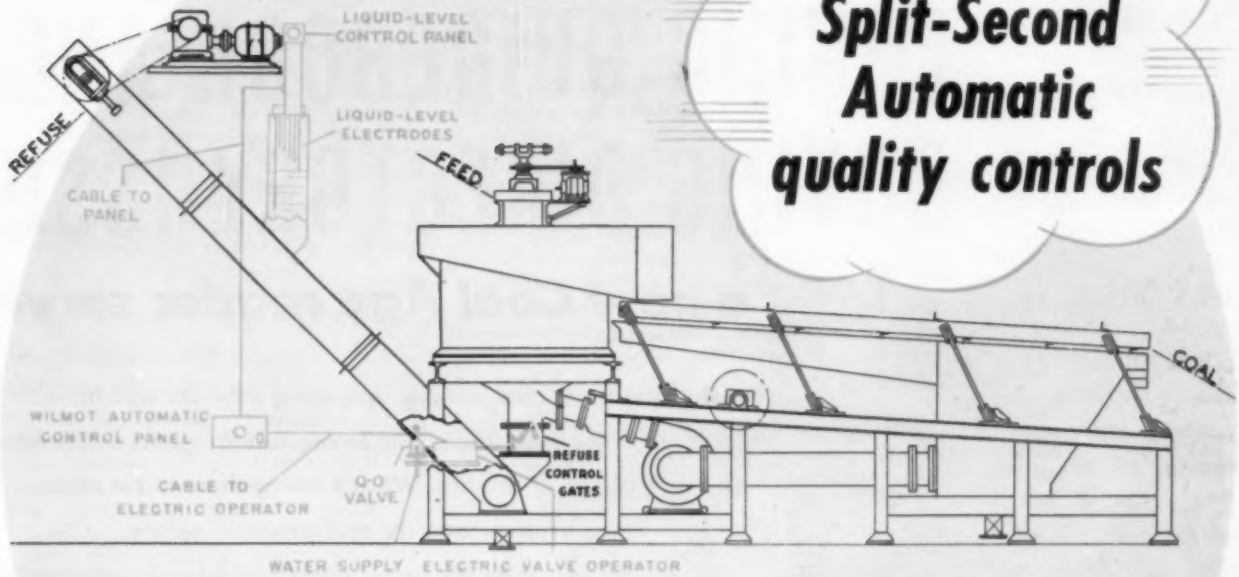
For the past 5 yr, Mr. Tobey has been associated with the Blue Diamond Coal Co., Cincinnati, Ohio, as industrial sales engineer and previously was with Battelle Memorial Institute. He is the son of Julian E. Tobey, president of Appalachian Coals, Inc., Cincinnati.

Ky. Group Re-Elects Officers

The Big Sandy-Elkhorn Coal Operators' Association at its annual meeting in Lexington, Ky., June 17, re-elected all officers, as follows: president, W. W. Goldsmith, Charleston, W. Va.; first vice-president, Virgil D. Picklesimer, Seco; secretary, C. W. Davis, Pikeville; and treasurer, L. B. Brashear, Manton. Also named as new directors were C. D. Reed and A. N. Cooley, both of Drift.

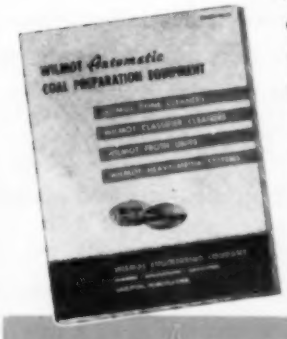
WILMOT CONE CLEANERS *feature*

Split-Second Automatic quality controls

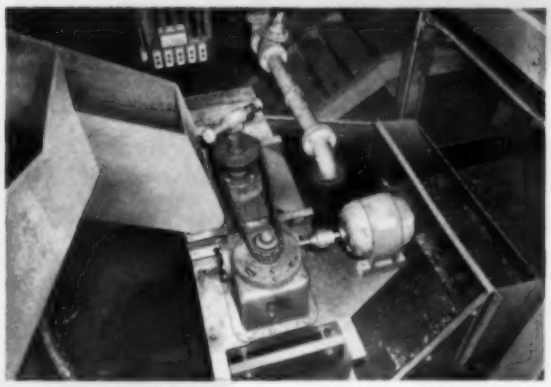


Patented WILMOT CONTROLS UP YIELD, CUT LABOR COSTS

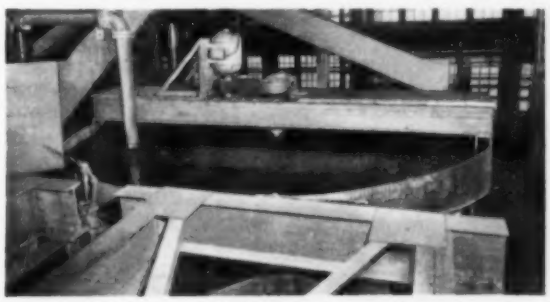
Wilmot automatic quality controls, illustrated in orange above, are as instant in their adjustment to changing feed conditions as the pulse of the electric current. Thus Wilmot coal preparation equipment enables you to raise the percentage of yield from your feed, first, by more accurately controlling the quality of refuse. Secondly, the positive drive, pictured above the tank, assures the floating off of all clean coal by maintaining the upward currents in absolute constancy. The completely automatic nature of the controls makes possible a near approach to push-button preparation, enabling users to effect remarkable increases in their yield/labor ratio. For complete details of Wilmot automatic equipment send for...



New **Bulletin on Coal Preparation**



Above, Wilmot cone cleaner; below, classifier. Also froth flotation and heavy-media equipment. Furnished for all sizes of plants and all sizes of coal; individual units or complete systems.



WILMOT ENGINEERING CO. HAZLETON, PA. *Plant:* WHITE HAVEN, PA.

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THE COAL AGE MINING GUIDEBOOK and BUYING DIRECTORY ISSUE

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Buying Directory
Equipment, Services and Materials

Coal Age in September presents the

MINING GUIDEBOOK AND BUYING DIRECTORY ISSUE

a new Coal Age reader service

For the first time, coal mining operating officials will have in one place, under one cover, fundamental information on every phase of mining. *What's being done* to cut costs, raise product quality and promote safety. *Why it's being done* and *how* it's accomplished. A source of helpful "know-how" basic principles.

The MINING GUIDEBOOK will contain six editorial sections—six Guidebooks—each complete in itself for convenient reference.

- ★ **Deep Mining Guidebook**
- ★ **Strip Mining Guidebook**
- ★ **Preparation Guidebook**
- ★ **Maintenance Guidebook**
- ★ **Supply Service Guidebook**
- ★ **Safety Guidebook**

And, in addition, a BUYING DIRECTORY of equipment, services and materials generally used by the coal mining industry. Arranged by products and including trade names, manufacturers' names and addresses, the BUYING DIRECTORY will help COAL AGE readers quickly locate sources of supplies. It will be in the same issue, under the same cover.

And there will be a reference to all advertising pages in the product listing to help COAL AGE readers obtain more detailed information on products or services.

The COAL AGE MINING GUIDEBOOK AND BUYING DIRECTORY issue will be mailed to COAL AGE subscribers, automatically, as a new additional subscription service. Plan now to receive your personal copy in September.

AIME Honors Humphrey

At the June meeting of its board of directors, the American Institute of Mining and Metallurgical Engineers elected Louis S. Cates and George M. Humphrey to Honorary Membership. The number of living Honorary Members is limited to 20, and the elections bring the roster up to 18. Mr. Humphrey, Secretary of the Treasury and former head of the Pittsburgh Consolidation Coal Co., became a member of the AIME in 1922 and received its Charles F. Rand Medal in 1947 "for constructive leadership in establishing great enterprises for the production of iron ore, of steel, and of coal; for signal success in the administration of large organizations engaged in these industries so vital to the economy of our country." Mr. Cates, chairman of the board of the Phelps Dodge Corp., was AIME president in 1946 and has been a member since 1904.

Anthracite Council Renews Public-Relations Program

The Anthracite Industry Council has authorized continuation of its public-relations program for the third year, starting Aug. 1. The program includes a new streamlined organization plan which will be administered by the Eastern States Retail Solid Fuel Conference through the Anthracite Information Bureau, New York City. Changes in program operation include the opening of a New England Anthracite Information Bureau at Room 1115, 80 Boyleston St., Boston, Mass., with Mrs. Ruth McGowan as New England field representative. Plans call for the opening of AIB branch offices at one or more centers in Pennsylvania and a field representative for that state will be named shortly. Public relations activities will be supervised by the council and its executive committee, with Arthur Schmidt continuing as managing director of the Anthracite Information Bureau.

MEMM Association Elects

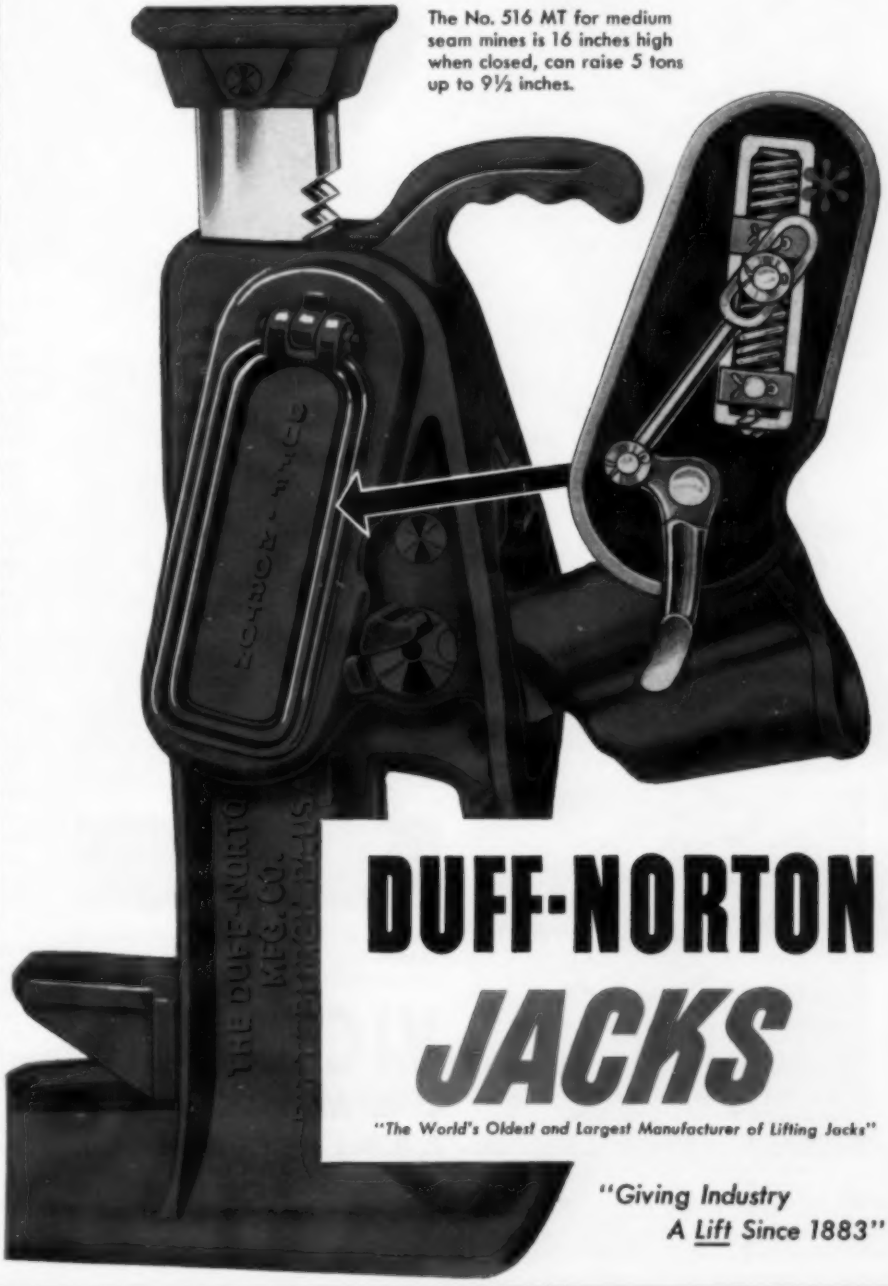
The Central Advisory Council of the Mining Electro-Mechanical Maintenance Association, at its final quarterly meeting, June 4, elected the following officers for 1955-56: president, J. W. Hunt, Pennsylvania State University; first vice president, R. S. James, USBM; second vice president, C. B. Tillson Jr., Crucible Steel Co.; third vice president, W. E. Schroeder, Schoeder Bros. Members of the executive committee elected were: A. E. Molinski, Bethlehem Mines Corp.; George Pete, Mather Collieries Co.; Charles Freeland, Bethlehem Mines Corp.; Merle Campbell, Ebensburg Coal Co.; C. A. Kirkpatrick, Harmar Coal Co.; M. E. Altimus Jr., Pennsylvania State University; Kenneth Benson, Ohio Brass Co.; Harry J. Young, Cook-Wilson; George E. Hubrig, U. S. Rubber Co.; Robert A. Huth, Universal Welding & Metals Co. Tentative approval has been given by the council for the establishment of an associate council in Utah, which has been under consideration for a year. The organization committee is reportedly fostering the interest of other

Why This Special Mine Jack Will Give Longer, Trouble-Free Service

When Duff-Norton engineers set out to design safer, longer lasting jacks for men who work in and around coal mines, they discovered one startling fact—about 90% of jack maintenance was in replacing worn springs in the mechanism that controls the jack's raising or lowering action. Result? All Duff-Norton mining jacks are equipped with a patented,* adjustable spring mechanism which assures positive engagement of rack teeth. The spring's tension can be easily adjusted with a screw driver without removing any part of the jack. Should the spring eventually lose its resiliency, there's no need to send the jack to the repair shop. A new, complete spring mechanism assembly can be quickly installed by anyone in a matter of minutes, making the jack as good as new! In fact, as a special service, Duff-Norton distributors carry in stock extra spring mechanisms for all Duff-Norton ratchet lowering jacks.

Ask your local distributor or write the world's oldest and largest manufacturer of lifting jacks for a copy of "*A Handy Guide for Selecting Duff-Norton Mine Jacks.*" This colorful, illustrated booklet is full of useful information about all kinds of jacks for coal men. Write for bulletin AD10-J to Duff-Norton Company, P.O. Box 1889, Pittsburgh 30, Pa.

The No. 516 MT for medium seam mines is 16 inches high when closed, can raise 5 tons up to 9½ inches.



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VICTAULIC COUPLINGS

Styles 77, 77-D for standard applications. Simple, fast to install—sturdy and reliable. Sizes ¾" to 30". Style 75 Light-Weight Couplings for light duty applications. Sizes 2", 3", 4". Additional styles for cast iron, plastic and other pipes. Sizes through 60".

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Complete line of Elbows, Tees, Reducers, Laterals, etc.—to fit all Victaulic Couplings. Streamlined for top efficiency, easy to install. Sizes ¾" to 12".

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Handy, on-the-job grooving tools that do the work in half the time. Light weight, easy to handle—operate manually or from any power drive. Automatic groove position and depth. Sizes ¾" to 8".

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Style 99 for plain or beveled end pipe. Best engineered, most useful plain end joint on the market. Simple, husky — easy and fast to install. Takes strong bull-dog grip on pipe. Sizes 2" to 8".

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Victaulic's new boltless, speed coupling. — Style 78 — hinged into one assembly. Hand-locks for time and dollar savings. Sizes 1", 1¼", 2", 3", 4".

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Promptly available from distributor stocks coast-to-coast. Write for NEW Victaulic Catalog-Manual 55-7A

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mining areas in associate-council development, so that a national association of maintenance men may be developed in the near future.

Parker Heads Alabama Institute

The Alabama Mining Institute, Birmingham, has elected W. H. Parker president, succeeding the late I. W. Rouzer. Mr. Parker had been associated with the Stith Coal Co. for many years and was executive vice president, operations and sales, when the company was liquidated last year. Named to fill vacancies on the board of governors were John E. Urquhart, president, Woodward Iron Co.; H. S. Davidson, president, Davidson Coal Co.; and Milton H. Fies, vice president, coal operations, Alabama Power Co. H. P. Sibert, the institute's traffic manager since 1939, was elected secretary-treasurer.

Anthracite AIME to Honor Williams for 50-Yr Membership

R. Y. Williams, consulting mining engineer, Pottsville, Pa., was to be honored for 50 yr of membership in the AIME at the summer meeting of the Pennsylvania-Anthracite Section in Dallas June 30, it was announced earlier.

William W. Everett, vice president, Glen Alden Corp., and AIME section chairman, was named to preside at the dinner meeting. H. DeWitt Smith, AIME president, was scheduled to present the organization's Legion of Honor to Mr. Williams. A. F. Hutcheson, Atlas Powder Co., Wilkes-Barre, was general chairman of the arrangements committee.

A graduate in mining engineering from Columbia University, class of 1904, Mr. Williams was active in both the anthracite and bituminous fields before coming to Pottsville in 1928 as a consulting engineer in general practice. In 1941, when the anthracite control plan was begun, he was retained by the committee as its engineer. He is currently serving also as chairman of the executive committee of the Production Control Plan.

Restoration Work Begun on Jamison No. 9 Mine

Rehabilitation of the Jamison No. 9 mine of the Jamison Coal & Coke Co., a subsidiary of the Pittsburgh Consolidation Coal Co., began early last month and it was expected that the Farmington, W. Va., property would be back in full production by Oct. 1, according to George W. McCaa, general manager. The mine was wrecked by an underground explosion last Nov. 13, shortly after the completion of a large-scale modernization program and acquisition of the property by Pittsburgh Consol. One man was killed on the surface and the bodies of 15 others were entombed when it became necessary to seal off the property several days later. Seals were removed March 10 and recovery operation began 4 days later. The last body was recovered May 31 and the work of restoring underground and surface facilities was started several days afterwards. Two sections of the mine are expected to be in production by mid-July, it was reported, with the other four resuming in October.

A Lift Since 1883

"You've got to **roll it out** for **easy loading**"

AIRDOX

NON-EXPLOSIVE MINING METHOD

Cuts Costs 5 Ways

- Produces less fines in face preparation
- Rolls coal forward for faster, easier loading.
- Easier on "tender" roofs—cuts shoring, bolting
- Lowers cleaning costs by minimizing fines
- Reduces degradation—no shattered coal

And that's just what the gentle, heaving action of Airdox does. Coal is dislodged from the working face and *pushed forward* in a loose, easy-to-handle pile. There's no digging to do. This means faster loading and less wear and maintenance on mechanical equipment. Add to these advantages a drastic reduction of fines at the working face and it's easy to see why Airdox is the most economical means known for face preparation.

Very possibly an Airdox installation can bring these advantages to your mine. Write and we'll arrange a free survey.

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Simplify maintenance, and do a better job of it too! That's what you want, and that's what you accomplish when you switch to Sinclair LITHOLINE® Multi-Purpose Grease. This all-purpose lubricant enables you to cut service time to a minimum, and get lasting protection for all bearings and fittings. At all temperatures it's easy to use. Moreover, your grease jobs last longer because LITHOLINE resists water-washout, doesn't thin in summer heat, and won't oxidize and cake in bearing crevices.

What more could you ask than a proven "one grease – one gun" system of superior lubrication? There's less wear, no wasted time, and you save money. Call a local Sinclair Representative today for full information, or write for the new LITHOLINE pamphlet to Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

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Coal Income Drops in Britain

Britain's coal industry showed a financial loss of £3,749,000 ($10,400,000) last year, according to a report by the National Coal Board released June 21. It was indicated that the loss was partly due to coal imports needed to meet production deficiencies at home. The industry also suffered the highest number of wildcat strikes since the Socialist Government nationalized it in 1947. Total salable coal, deep-mined and open-cast, in 1954 was 224,300,000 long tons, or 70,000 tons more than in 1953. The average production per man-shift, 2,760 lb, was the highest in British history but the average number of men employed fell 5,700 to 707,200. The number of unofficial work stoppages was put at 2,614, as compared to 2,324 in 1953.

Panther Valley Firms Join Sales and Engineering Forces

Panther Valley Coal Co. and Coaldale Mining Co., both now operating anthracite collieries formerly operated by Lehigh Navigation Coal Co., in a joint statement announced that henceforth sales, engineering and accounting for both companies will be on a cooperative basis. Panther Valley Coal Co. operates what had been the Lansford and Nesquehoning Collieries of LNC, and Coaldale Mining Co., directed by Pierce Management, Inc., Scranton, Pa., operates the Coaldale, Pa., properties.

Old Timers' Present Award To Penn State Senior

GEORGE C. TREVORROW JR. is shown receiving the Old Timers' watch award as the outstanding senior in Coal Mine engineering at Pennsylvania State University from Dr. Charles E. Lawall, assistant vice president, C.&O. Ry. Mr. Trevorrow, from Verona, Pa., is a member of the mineral industries' honorary, Sigma Gamma Epsilon, Delta Chi national fraternity and was at one time president of the local AIME student chapter. Mr. Trevorrow plans to enter the coal production field upon graduation, via the Youngstown Sheet & Tube Corp.

It was also announced that W. Julian Parton, president, Panther Valley Coal Co., has resigned the post to devote full time to consulting activities. Mr. Parton formerly was president of Lehigh Navigation Coal Co., taking over the presidency at Panther Valley when the new company was formed in 1954. Frank Fauzio, vice president, Panther Valley, resigned that office to give full time to the operations of Fauzio Bros., stripping contractors, Nesquehoning, Pa. J. J. Crane, formerly general manager, Panther Valley, becomes executive vice president, in charge of operations.

CF&I Mines Cited for Safety

Three Colorado Fuel & Iron Corp. coal mines have taken top honors in the 1954 safety honor roll chosen from among 158 mines operating in Colorado. CF&I's Frederick, Morley and Allen coal mines took first, third and fourth places, respectively, for their safety records in the 50,000 or more man-hours per injury category. First place went to the Frederick mine, which operated 146,968 man-hours per injury during the year. The company's safety achievements were recorded in the 1954 annual report of the Colorado Coal Mine Inspection Department.

Fires Hit in Three States

A fire of undetermined origin June 2 caused $60,000 to $80,000 damage at the Ringgold cleaning plant of the Freebrook Corp., Timblin, Pa., according to reports. It was the second fire reported for the plant this year. Last January a blaze caused some $20,000 damage. At Oakwood, Va., a fire which broke out late in the evening of June 11 reportedly destroyed the tipple of the Oakwood-Red Ash Coal Co., causing an estimated $150,000 loss. While the cause was not immediately reported, local fire officials believed that the fire probably began in a

Lady Storekeeper in Alabama

"WHAT'S MY LINE" TV PANEL would have difficulty in determining Mrs. Evelyn Irwin's occupation. S. Guy Little, who travels all over the United States for Penn Machine Co., Johnstown, Pa., told his Alabama and Tennessee distributor, Salmon & Co., that in all his years of sales promotion throughout the coal mining industry he had never before seen a woman storekeeper for a coal mine until he recently met Mrs. Irwin.

She handles the many duties and responsibilities of a storekeeper at one of Alabama's largest coal mines. Her 12 yr of faithful, efficient service is recognized by all who have dealt with her. Keeping everybody happy at a coal mine storehouse is a Herculean task, yet Mrs. Irwin accomplishes this in a businesslike and gracious manner.

Government Fuels Plant Suggested As Substitute For Atomic Power

The House of Representatives was asked June 15 to "give thought to" the appropriation of sufficient funds to erect an experimental synthetic-fuels plant large enough for conversion to a commercial operation. The recommendation came from Rep. John P. Saylor (R., Pa.) as a substitution for the use of government funds to construct atomic-powered electric utility plants.

"While it is not possible to foresee the exact date at which the cost of producing synthetic fuels coincides with the cost of producing conventional fuels, I believe that construction of a synthetic fuels plant should be given serious consideration right now," Rep. Saylor said. He stated that his recommendation is based primarily on the government's willingness—and, in fact, insistence—to put up money for atomic-powered generating stations. He said that while there is universal hope for the successful application of all of nuclear fission's potentialities to industry on a commercial basis as soon as possible, he, nevertheless "cannot accept the government's philosophy of direct contribution to this development while excluding other sources of power from similar subsidies."

Pointing out that the coal industry has never asked for subsidies, he said that building of synthetic fuels plants with federal funds would merely be "more reasonable from the standpoint of national defense and long-range energy consideration," than to continue grants for generating electric power by use of the atom. The Cambria-Indiana-Armstrong area, which has large coal reserves and adequate water supplies, was suggested as a site for the coal-conversion facilities by Rep. Saylor. He reminded his colleagues that the area has been hard hit by unemployment and would welcome a plant for a synthetic-fuels industry.

coal car underneath the tipple. On June 3, an underground belt fire broke out between shifts on the main haulageway of the Osage (W. Va.) No. 3 mine of the Christopher Coal Co., Div. of Pittsburgh Consolidation Coal Co. After day-long efforts to get it under control, a 1,500-ft area about 2 mi inside was sealed-off. As a precautionary measure, some 600 men in the connecting Arkwright and Pursglove No. 1 mines were withdrawn, but were expected to return to work shortly. No injuries were involved and the cause of the fire was not immediately determined.

1954 Company Tonnages Compiled By Keystone Manual

"Coal Production in the U. S. A., by Companies for the Year 1954," published by *Keystone Coal Buyers' Manual*, a *Coal Age* affiliate, is now available. The only nationwide compilation of industry tonnages published, the booklet contains actual production figures for every coal company that produced 100,000 tons or over in that year. Among the interesting highlights brought out in this year's issue of the annual study are:

Some 331,156,809 tons, or 84.5% of the total bituminous coal and lignite, was produced by 379 companies. The largest organization, Pittsburgh Consolidation, accounted for 22,916,792 tons, or 5.9%.

There were 68 producers of one million tons or over, 55 commercial and 13 captives. In this group, 25 of the commercial and three of the captive operators produced more coal in 1954 than in 1947 (coal's peak producing year). The 28 operators showed an increase of 45%, and increased their share of national production by 8.52% in these 7 yr.

The number of companies included in the million-ton-and-over group declined from 246 in 1947 to 185 in 1954, while the number producing 100,000 tons or over declined from 1,556 to 1,028.

Anthracite figures are also included covering 33 companies who produced 22,507,717 tons, or 86.1% of the total. Seven companies, each producing more than one million tons, accounted for 15,824,448 tons, or 60.5% of the total.

The 1954 edition is available from *Keystone Coal Buyers' Manual*, 330 West 42d St., New York 36, N. Y. Price is $5 per copy.

New Kentucky Slope to Mine 1,000,000 Tons Yearly

The DeKoven Coal Mining Co., Sturgis, Ky., will soon begin construction of a new slope mine at DeKoven, Ky., it was announced last month by Courtney Quirey, president of the company. It will be a completely mechanized mine, using belt haulage, with an ultimate capacity of 1,000,000 tons per year. The main slope, approximately 1,000 ft long, will be driven to the Kentucky No. 9 coal. Future plans provide for the eventual mining of the No. 6 seam which is 4½ ft thick and lies some 250 ft below the No. 9 seam.

After crushing to 3-in top size, coal will be carried direct to the preparation plant or to raw-coal storage. The preparation plant will be of the most modern design capable of processing 1,000 tph and of closed-circuit design. The Illinois Central R. R. will service the mine and barge-loading facilities will be located on the Ohio River. Coal for river transportation will be taken to a washed-coal stockpile with a capacity of 20,000 tons. There will be a 42-in conveyor belt approximately 6,000 ft long from this stockpile to the river.

Mr. Quirey, who will be in charge of operations, will be assisted by Davis Read, consulting engineer, Chicago, in the planning and operation of the mine. Doyle Whitmer will be mine engineer and Hugh Stewart will be chief clerk. The mine will produce coal from properties formerly controlled by the Ohio Valley Coal Co., the Madison Coal Co. and adjacent land owners. The mine is expected to be completed and in operation by the summer of 1956. The Pittsburg & Midway Coal Co., Chicago, will be sales agent for the DeKoven Coal Mining Co.

Kentucky Senior Wins Old Timers' Award

BILLY TOM HENSHAW (left), Henshaw, Ky., received the Old Timers' gold watch award this year at the University of Kentucky where he was the outstanding senior in mining engineering. With him are his wife and E. H. Jenks, assistant to the president, Hanna Coal Co., St. Clairsville, Ohio, who presented the award.

Illinois Mine Rescue Unit Holds Meeting

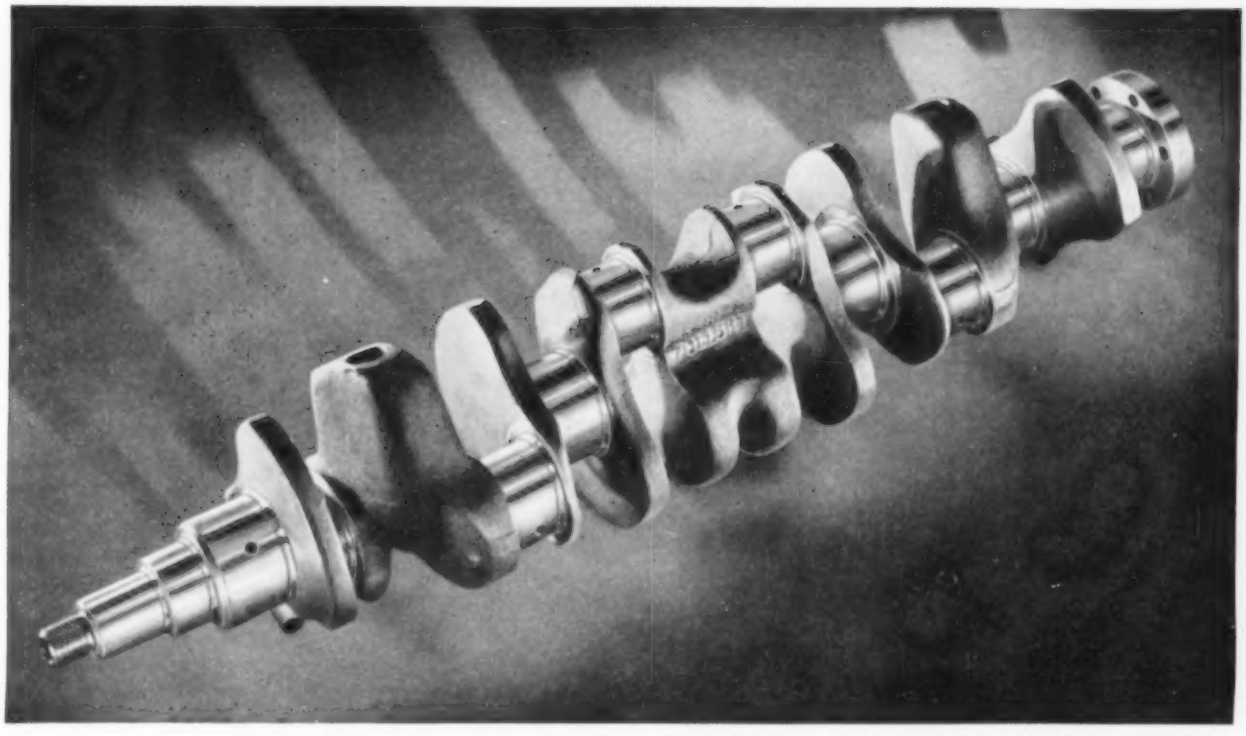
OVER 250 MEMBERS of the Fred J. Bailey Post No. 4, National Mine Rescue Association, attended the June 4th meeting in Benton, Ill. Among the Smoke-eaters participating in the program were, above: Ward Padgett (left), vice president of the post and general superintendent, Bell and Zoller Coal Co.; E. E. Quenon, district supervisor, USBM, Vincennes, Ind.; Coy L. South, secretary-treasurer of the post and coal mine inspector, USBM, Benton, Ill.; George Stachura, president of the post and underground superintendent, Orient No. 3 mine, Freeman Coal Mining Corp.; and Howard T. Batman, general manager and counsel, Lynch Coal Operators' Reciprocal Association.

Other speakers were: Charles A. Purcell, director, Indiana Department of Mines and Mining; Howard Lewis, vice president in charge of operations, Old Ben Coal Corp.; Ira Inmann, secretary, West Kentucky Mining Institute; Murrell Reak, assistant director, Illinois Department of Mines and Minerals; W. R. Campbell, safety director, Underwriters Safety and Claims, Inc.; John Stachura, superintendent, Enoco Collieries, Inc.; Ted Mitchell, UMWA; and Nat Kirk, superintendent, Snow Hill Coal Corp.

John Stachura presented to Howard Lewis a certificate of honor for rendering distinguished service to the coal-mining industry in preventing and limiting mine fires and explosions, in carrying on recovery operations and in promoting use of outstanding mine rescue devices.

Objectives of the association are (1) to advance the science of preventing and controlling mine accidents, especially mine fires and explosions; (2) to promote safe and effective methods of mine rescue and recovery operations; (3) to encourage professional improvement of members; and (4) to foster social relations among men in mine-rescue work.

A truck engine needs a "backbone" like this—



From fiery forges and precision machines come extra-strong INTERNATIONAL crankshafts. Those used in light-duty models are 17% heavier than the average of comparable forged or cast alloy 6-cylinder designs—for maximum strength and rigidity, long life.

to save you the BIG money

Crankshafts are just one example of INTERNATIONAL all-truck engineering that saves you the *big money.*

Of the five leading makes, only INTERNATIONAL offers a complete line that is *all-truck built* . . . with no automobile engines or components asked to do a truck job.

You save the most with an INTERNATIONAL that's *all-truck built* to last longer. It earns its keep in lower over-the-years operating and maintenance cost. It pays for itself in use. It saves you—earns you—the *big money.*

Keeping costs down has made INTERNATIONAL the heavy-duty leader for 23 straight years. Let your INTERNATIONAL Dealer or Branch show you the right INTERNATIONAL for your job—built to save you the BIG money.

INTERNATIONAL HARVESTER COMPANY • CHICAGO

There's an INTERNATIONAL *exactly right* for every mine hauling job—*all-truck built to save you the BIG money.* 200 basic models—4,200 to 90,000 lbs. GVW, conventional and COE, 4-wheel, 6-wheel, four-wheel-drive. World's widest choice of power and power transmission options.

INTERNATIONAL® TRUCKS

All-Truck Built to save you the BIG money!

Top TV Comedy! Ronald Colman and Benita Hume in "The Halls of Ivy," CBS-TV, Tuesdays, 8:30 p.m., EDT

International Harvester Builds **McCORMICK®** Farm Equipment and **FARMALL®** Tractors...Motor Trucks...Industrial Power...Refrigerators and Freezers

Personal Notes

Edgar C. Weichel, vice president and general manager of The Hudson Coal Co., Scranton, Pa., last month resigned at his own request, effective July 1. In making the announcement, G. B. Fillmore, company president, said: "Mr. Weichel has been a very efficient official of our company since entering our employ in 1923 and his resignation is accepted with much regret." Widely known in the field, Mr. Weichel entered the anthracite industry in 1903 in the engineering department of the Pennsylvania Coal Co. Following posts with several anthracite and bituminous firms, he joined Hudson as a mining engineer in 1923. He was named assistant general manager in 1928, became general manager in 1946 and was elected vice president in 1950. His resignation as a member of the Anthracite Conciliation Board, one of the many industry posts he has held, also was announced last month.

The reassignment of two officials of the Glen Alden Coal Co., Wilkes-Barre, Pa., was announced last month by William W. Everett, vice president in charge of operations. **Norman F. Becker,** formerly superintendent of the Woodward colliery, has been given a special assignment in accident prevention outside the regular safety department and will report directly to Mr. Everett. **H. E. Pearce** was appointed superintendent at Woodward, to succeed Mr. Becker. Until assigned to special work on mechanical and bonus mining a year ago, Mr. Pearce was superintendent at Wanamie colliery.

Edward C. Curtis, Pennsylvania state mine inspector, retired last month, to bring to a close a career spanning 58½ yr in the mining industry. A native of Nanticoke, Pa., Mr. Curtis started work as a slate picker at the age of 10. He held various posts in mines of the Susquehanna Collieries Div. and was chief mine inspector for the company when he was first appointed state mine inspector 38 yr ago. Mr. Curtis is a past president of the Anthracite Mine Inspectors' Institute and was chairman of its executive committee until his retirement.

George R. Beehler, general manager of the Glen Alden Corp., last month was elected a member of the Anthracite Board of Conciliation, succeeding Edgar C. Weichel, vice president of The Hudson Coal Co., whose retirement was announced last month. With Glen Alden since 1922, Mr. Beehler has geen general manager since December, 1953. He has been active in labor relations for many years, having served as a consultant in that field to some 40 anthracite companies.

Obituaries

George P. Fitz, 70, president of the Ajax Coal Co., Hazard, Ky., died June 10 at the Central Baptist Hospital, Lexington, Ky. Mr. Fitz served as president of the Hazard Coal Operators' Association from 1935 until 1950 and had been a member of the association's board of directors since that time. He also was on the board of directors of the Benedict Coal Corp. of Tennessee, and had served on committees of the National Coal Association.

New Superintendent at B&Z Kentucky Properties

EUGENE T. MORONI (left), formerly chief engineer for the Bell & Zoller Coal Co., Johnston City, Ill., has been named general superintendent of the company's West Kentucky Div., with headquarters in Madisonville, Ky. He succeeds Herman E. Knight (right), who resigned to enter the uranium mining field in the West.

EQUIPMENT APPROVALS

Ten approvals of permissible equipment were issued by the U. S. Bureau of Mines in May, as follows:

Joy Mfg. Co.—Type 1CM-2BF continuous miner (with drills); four 7½-hp, one 15-hp, one 26-hp, and two 100-hp motors, 500 v, DC; Approval 2-1047A; May 27.

The Long Co.—Model 100A utility truck: one 5-hp motor, 250 v, DC; Approval 2-1059; May 3.

Joy Mfg. Co.—Type X179-119 Model 15FA chain-conveyor drive unit; one 20-hp motor, 550 v, AC; Approval 2-1060A; May 4.

Mine Safety Appliances Co.— Bantam Type 400 rock-dust distributor; one 5-hp motor, 250 v, DC; Approval 2-1061; May 6.

Goodman Mfg. Co.—Type 570-10 shuttle car; one 10-hp and two 15-hp motors, 250 v, DC; Approval 2-1062; May 11.

Joy Mfg. Co.—Type 20BU3-1E loader with X855-3 bridge conveyor; one 3-hp and two 22-hp motors, 250 v, DC; Approval 2-1063; May 13.

Goodman Mfg. Co.—Type 99-5AT-36 belt conveyor; one 50-hp motor 250 v, DC; Approval 2-1064; May 16.

Joy Mfg. Co.—Type TM2-1E Twin Borer miner; two 15-hp and two 100-hp motors, 250 v, DC; Approval 2-1065; May 16.

Goodman Mfg. Co.—Type 402 miner; two 10-hp and two 100-hp motors, 250 v, DC; Approval 2-1066; May 23.

The Long Co.—Model M500 mobile conveyor; one 25-hp motor, 250 v, DC; Approval 2-1067; May 31.

Howard A. Marshall, 64, president of the Wolf Den Coal Corp., Shallmar, Md., died May 28. With the operation since its start around 1919, Mr. Marshall had been superintendent before becoming president of the company in 1938.

J. Kirk Renner, 72, president of the United Pocahontas Coal Co., Crumpler, W. Va., died suddenly May 18 at his home in Connellsville, Pa. A graduate of the University of Michigan Law School, Mr. Renner had maintained a law office in Connellsville for 45 yr.

J. R. Hoffert, who retired in December, 1954, as chief sanitary engineer, Pennsylvania Dept. of Health, died at his home at Camp Hill, Pa., June 4, following a long illness. Mr. Hoffert joined the Department of Health in 1919. From 1927 to 1946 he served as assistant secretary, acting secretary and secretary of the Sanitary Water Board, and was instrumental in launching and supervising the board's clean streams program.

US RUBBER

United States Rubber Company 4-year project pays off—
mine operators report they're well ahead with U. S. Royal!

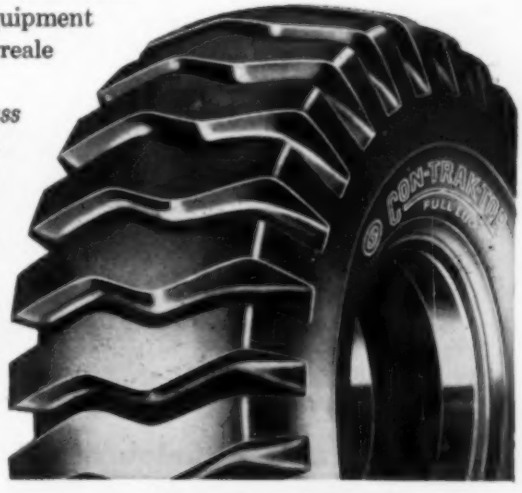
"Practically eliminated our downtime"
says P. Correale, Correale Construction, Hazleton, Pa.
"There's no tougher test for tires than anthracite coal stripping. Tire failure here can knock out a truck for a 7-hour shift—*for a $400 loss.* But U. S. Royal Con-Trak-Tors have practically *eliminated* our downtime."

Down Goes Downtime!

The new U. S. Royal Con-Trak-Tor—Full Lug, an important result of U. S. Royal's 4-Year Truck Tire Project, is cutting equipment downtime 'way down for leading mine operators like Correale Construction Co.

Good reasons, too! The Con-Trak-Tor's *Nylon cord carcass* stands up to vicious shocks, shrugs off rocks and snags. It has *triple impact protection*—extra rubber between plies, double shock-pads under the tread, extra-tough construction at the crown. Its *full lug traction* pulls right through toughest going, just *won't* bog down!

Why not let the Con-Trak-Tor prove it can reduce *your* downtime, lower *your* operating costs? Your U. S. Royal Dealer has this great tire in your size. Have him put it on your wheels—and prove to yourself why mine operators like Correale Construction Co. report they're *well ahead* with U. S. Royal!



U.S. ROYAL NYLON CON-TRAK-TOR FULL LUG

ASK YOUR U. S. ROYAL DISTRIBUTOR TO SHOW YOU THE NEW FILM ON BETTER HIGHWAYS: "MEMO TO MARS"

Among the Manufacturers

Gilbert Heads Wilmot Sales

Wilmot Engineering Co., Hazleton, Pa., has named A. G. Gilbert, previously with Heyl & Patterson, Inc., as general sales manager in charge of sales for all the company's divisions. The appointment of Mr. Gilbert is a further step in the company's expanding program of marketing equipment to the soft-coal industry, according to George L. Wilmot, company president. Mr. Gilbert will headquarter at Wilmot's White Haven, Pa., plant. Advertising and sales promotion will be under the direction of Harold R. Middleton.

Lovell Heads U. S. Rubber Div.

G. Allen Lovell has been elected a vice president of United States Rubber Co., New York, and appointed general manager of its mechanical goods division. Assistant general manager of the division since last November, Mr. Lovell joined U. S. Rubber as an apprentice in 1918, becoming manager of production control in 1932. In 1936 he joined the sales department of the footwear and general products division, became manager of coated fabrics sales in 1938, sales manager of foam rubber in 1944 and sales manager of all manufacturers' products in 1949.

Penn Machine District Manager

Penn Machine Co., Pittsburgh, Pa., has announced the appointment of Jack L. Berkebile as district sales manager with headquarters in Johnstown, Pa. Associated with the company for the past 20 yr as a salesman, Mr. Berkebile will be in charge of sales in the territories of Pennsylvania, Ohio and northern West Virginia.

Campbello Heads Marion Sales

Marion Power Shovel Co., Marion, Ohio, has appointed Robert Campbello as sales manager in charge of sales of all Marion machines sold through distributors in the United States and Canada. A veteran of long standing in the power shovel industry, Mr. Campbello was associated with the Bucyrus-Erie Co. for 17 yr in various sales capacities prior to coming to Marion. He served as manager of Bucyrus-Erie's office in Washington, where he was in charge of the firm's governmental operations. From 1929 to 1938 he was associated with the Tractor & Equipment Co. and the H. O. Penn Machinery Co., distributors of construction machinery in New York City.

M-H Acquires Cardox Corp.

A. W. Herrington, chairman of the board of directors of Marmon-Herrington Co., Inc., Indianapolis, has announced completion of negotiations by his company with the estate of the late Herbert Bell, and others, for the purchase of substantially all of the common stock of the Cardox Corp., Chicago. Well known in coal mining, Cardox manufactures chemicals, mining equipment, fire-fighting equipment, and agricultural equipment. It has six manufacturing plants, with a new plant nearing completion at Memphis, Tenn., and maintains offices in principal cities throughout the United States. Cardox Corp. will be operated as a separate corporation, and present executives of Cardox have agreed to remain on under Marmon-Herrington direction. Cardox has been aggressively expanding its sales and facilities, and these policies will be continued, the new owners report. Organized in 1931, Marmon-Herrington is a producer of "All-Wheel-Drive" trucks, trolley and motor coaches, fire trucks and other specialized vehicles.

New Crusher Firm Established

Establishment of a new division, Crusher Engineering, with headquarters in Philadelphia, Pa., has been announced by Poor & Co., Chicago. John Plimpton, formerly with the Pennsylvania Crusher Co., has been appointed vice president in charge of the new division. F. H. Neely, also formerly with Pennsylvania Crusher, has been appointed chief design engineer. The new division will make available a complete line of crushers, breakers and pulverizers to industrial markets, plus forgings and special alloyed and manganese steel castings for the maintenance and repair of these and related products.

Allis-Chalmers Realigns Divisions

Allis-Chalmers Mfg. Co., Milwaukee, has announced the realignment of its operating divisions to meet increased demands of growing markets. Robert S. Stevenson, A-C president, said: "We are establishing six major operating divisions within the company which will serve to strengthen our position in the markets we serve and provide faster direct line service to our customers." J. L. Singleton, vice president and company director, will head the industries group of three divisions formerly known as the general machinery division; and W. G. Scholl, vice president and company director, will

Crane Co. Celebrates 100 Yr of Progress Since Its Founding

A CENTURY OF ACHIEVEMENT paralleling the advance of U. S. industry and living conditions over the past 100 yr is being reviewed and celebrated in 1955 by the Crane Co., Chicago, known as the world's largest manufacturer of valves and fittings and producer of kitchen, bathroom and heating equipment. Crane Co. had its beginning on July 4, 1855, when Richard Teller Crane, 23, opened the one-man self-built shop in Chicago shown at the left. The original shop is in sharp contrast to the company's present 160-acre Chicago works (right), one of a number of plants Crane operates in the U. S., Canada and England. Today, the company makes some 40,000 products and has 165 branch offices. It has entered the aircraft field through a subsidiary company and another subsidiary has a new titanium plant under construction in Chattanooga as part of its progressive program of product diversification.

THE *FORWARD* LOOK ...IN TRUCKS!

Dodge has changed the picture on performance, price!

Today there's a changed picture of truck power, payload, price! For example, do you know the answers to these 3 questions?

1—What trucks provide the highest horsepower of the 5 leading makes *in every conventional model*, ½-ton through 3½-ton?

2—What trucks have the highest payload in more models, 1½- through 4-ton, than any other leading make?

3—What trucks have the lowest factory retail price in more popular models than any other leading make?

In each case the answer is, "Dodge '*Job-Rated*' trucks" . . . the trucks with the Forward Look! Find out for yourself how Dodge trucks give you more visibility, more modern styling, more of everything you want in a truck. See your dependable Dodge Truck dealer now.

ALL-NEW

DODGE

"Job-Rated"

TRUCKS

PRODUCTS OF CHRYSLER CORPORATION

We did it this way to give you a bigger and better look at this new mine vehicle that's boosting production! - slashing costs! - making history!

The self-propelled Lee-Norse MINE PORTAL BUS with the exclusive split-roof!

The answer to speeded up transportation for your section production crews is here at last! It's the new self-propelled Lee-Norse MINE PORTAL BUS with the split-roof.

Yes, for the first time a vehicle that actually holds portal to portal time to a minimum—boosting tonnage!—lowering costs!—saving money!

Here's why the Lee-Norse MINE PORTAL BUS leads—

- "Tailor-made" for your seam—your condition!
- Capacity varies from 14 to 20 men depending on available clearances in mine!
- Two independent braking systems for complete safety—disc brakes (airplane type) are smoothly operated by either hydraulic or mechanical means.
- Unique split-roof gives the driver unhampered sweep vision in all directions at all times—trolley pole is always within his easy and safe reach.
- Designed and built by the originators of the well-known Lee Norse JITNEY and the famous Lee-Norse MINER.

Let us show you how this BUS CAN PAY ITS WAY - write or call

Lee-Norse Company

Specialists in Coal Mining Equipment

CHARLEROI, PA.

head the tractor group of three divisions formerly called the tractor division. Each division, will be headed by a general manager, as follows:

J. W. McMullen, formerly vice president, transformer and switchgear equipment, vice president and general manager of the power-equipment division, responsible for such products as turbines, condensers, generators, transformers, switchgear, regulators and nuclear power.

P. F. Bauer, manager, apparatus department and general manager of the firm's Norwood, Ohio, works, general manager of the new industrial-equipment division, covering processing machinery, such as, crushing, mining, cement, etc.

Heading the general products division will be William M. Wallace, previously manager of the processing machinery department, responsible for such products as motors, pumps, Texrope drives, controls and other general purpose equipment. R. M. Casper, previously manager of the general machinery division power department, becomes administrative assistant to Mr. Singleton.

The three new divisions in the tractor group are farm equipment, construction machinery and Buda. Boyd S. Oberlink, vice president, tractor division, will be vice president and general manager of the construction machinery division, including such products as crawler tractors, graders, scrapers and other earthmoving equipment. R. K. Mangan will continue as president and general manager of the Buda Div., producing diesel and gasoline engines, material-handling units, etc.

Dart Truck Elects President

The Dart Truck Co., Kansas City, Mo., has announced the election of George F. Dixon Jr. as president, succeeding Furber Marshall, former non-resident president, who becomes chairman of the board of directors. Mr. Marshall is president of the Carlisle Corp., Carlisle, Pa., of which Dart is a subsidiary company. Mr. Dixon, who for the past 1½ yr has served as vice president of the Carlisle Corp., will move to Kansas City.

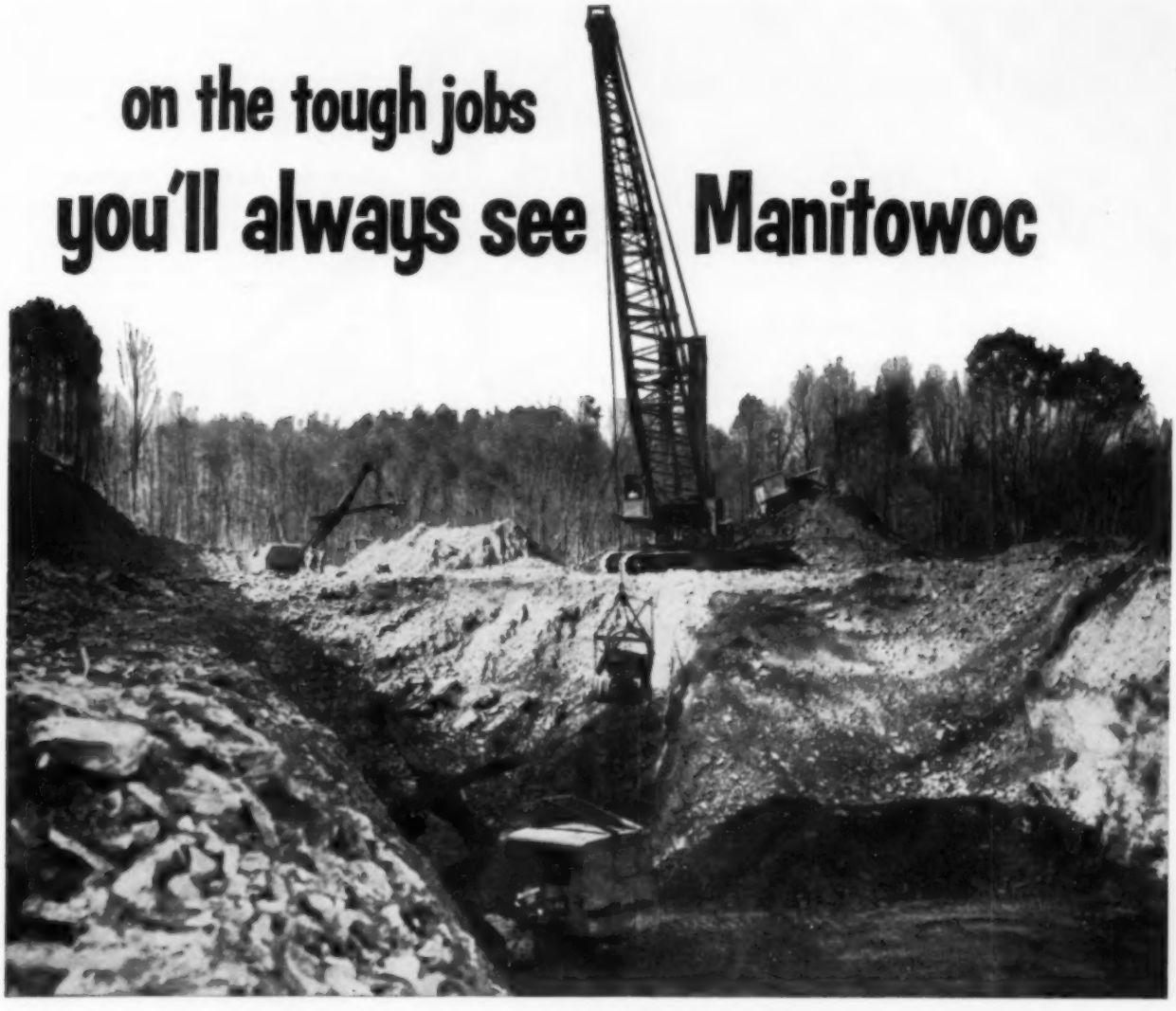
Goodman Official Dies

Charles A. Pratt, senior vice president, Goodman Mfg. Co., Chicago, died June 15 at his residence in Evanston, Ill. Associated with Goodman since 1904, Mr. Pratt was appointed vice president in 1918 and served on the board of directors for 31 yr. Engineering was his field of activity, and during the past several years of semi-retirement he continued to act in a consulting capacity.

Goodyear Product Manager

Claude E. Davis has been named manager of packing and special products sales for the Goodyear Tire & Rubber Co., Akron, Ohio. He had been on special development work for the company's industrial products division. He became associated with Goodyear in 1943 after graduation from the Missouri School of Mines. Following army service during which he worked for the U. S. Geological Survey and U. S. Bureau of Mines in making a study of the Japanese coal industry, Mr. Davis returned to Goodyear's

on the tough jobs you'll always see Manitowoc



Manitowocs are a big producing team for Benjamin Coal Company, Ansonville Pa.

When the going is rough and rugged — you'll always find Manitowocs on hand to do the job. Profitable performance on tough operations is a Manitowoc specialty.

Here are 3 Manitowocs "putting out" for Benjamin Coal Company near Ansonville, Pa. — a Model 4500 dragline with 6 yard bucket and 120′ boom strips from topside — in the pit a versatile 1¼ yard Model 2000 shovel covers a lot of ground, loading, cleaning and preparing — and in the background, a Model 3500 Hi-Lift shovel strips overburden at a record rate.

Look into Manitowoc's superiority — check such outstanding features as: faster working cycles, faster travel speeds, long reaching booms, top stability and simple but sturdy design and construction.

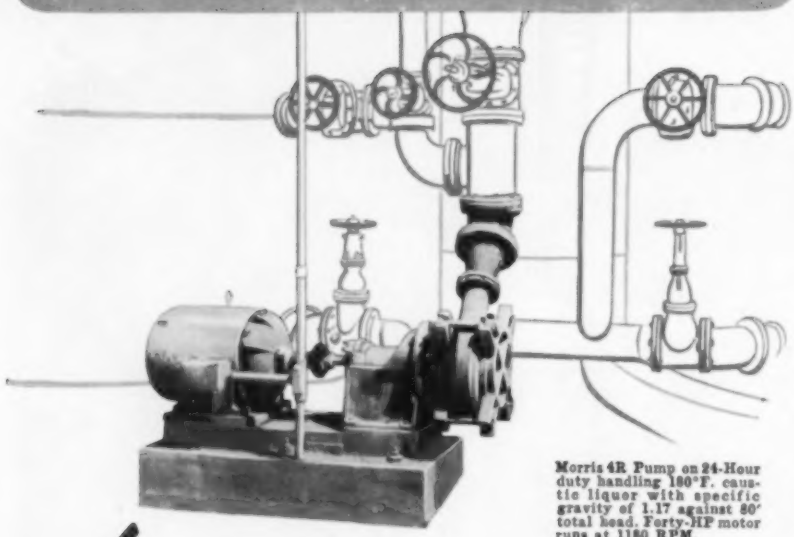
These are just some of the reasons why you see more and more Manitowocs on more and more stripping and mining operations. Send for details. Manitowoc Engineering Corp., Manitowoc, Wis.

MANITOWOC

SHOVELS 1-5 YD. Speed Crane CRANES 18-100 TON

For Continuous 24-Hour Pumping

of solid-or-chemical mixtures



Morris 4R Pump on 24-Hour duty handling 180°F. caustic liquor with specific gravity of 1.17 against 80' total head. Forty-HP motor runs at 1180 RPM.

Morris Type R Slurry Pumps

Ordinary harsh abrasives wear out your pump. Corrosive action of acids eats away its utility. Time-consuming maintenance and repairs cut down your production. Here's why the Morris Type R helps avoid these problems . . .

1.—Simple design. No internal studs and bolts—no troublesome internal joints and fits.

2.—Easily dismantled. Impeller and shaft sleeve reached by simply removing 4 *external* bolts.

3.—Abrasive resistant. Casing furnished in large variety of wear-resistant materials, including glass or porcelain.

4.—Large hydraulic passages. Permit low velocities to minimize wear and frequency of renewals.

5.—Drive-side suction. Stuffing box troubles practically eliminated under conditions of high suction pressure, high vaccum and high suction lift.

Let our engineers help you select the right pump for your job. Or write for Bulletin No. 181.

MORRIS MACHINE WORKS

Baldwinsville, N. Y.

Sales Offices in Principal Cities

MORRIS *Centrifugal Pumps*

belting sales department in 1947 and was assigned to the St. Louis district as a mining engineer. He was appointed field representative for the industrial products division in 1949 and assigned to Charleston, W. Va., until his return to Akron in 1952.

Carboloy Advances Engineer . .

R. F. Parker, formerly a sales engineer, has been appointed manager of carbide component sales for Carboloy Dept., General Electric Co., Detroit. Mr. Parker, who joined Carboloy 10 yr ago, was associated during World War II with the AEC as a metallurgist on the Manhattan Project and previously was a metallurgist in the research laboratory of Aluminum Co. of America.

P&H Names Sales Official

Harnischfeger Corp., Chicago, has appointed Gerald T. Raubach assistant sales manager for the P&H electric-shovel division. Mr. Raubach joined Harnischfeger in 1939 as a machinery erecting apprentice and for the past 5 yr has served as an electrical service engineer. Since 1952 he has been assistant manager of the service department.

Crane Promotes Lindholm

George G. Lindholm, manager of the Chicago branch of Crane Co. since 1948, has been appointed manager of the company's valve and fitting department at its general office, Chicago. He succeeds F. J. Wilkey, head of the department since 1944, who has been named special representative of Crane's industrial sales division. Thomas D. Kelly has been appointed manager of the Chicago branch to succeed Mr. Lindholm. He has been manager of the company's Cleveland branch since 1953.

Heads A-C Cincinnati Office

R. B. Fulton has been named manager of the Cincinnati district of Allis-Chalmers general machinery division. Mr. Fulton, a representative in Cincinnati since 1951, succeeds W. F. Daly, who retired June 30, after over 30 yr of service with Allis-Chalmers. With A-C since 1943, Mr. Fulton represented the company in the Pittsburgh and Detroit districts before being transferred to Cincinnati.

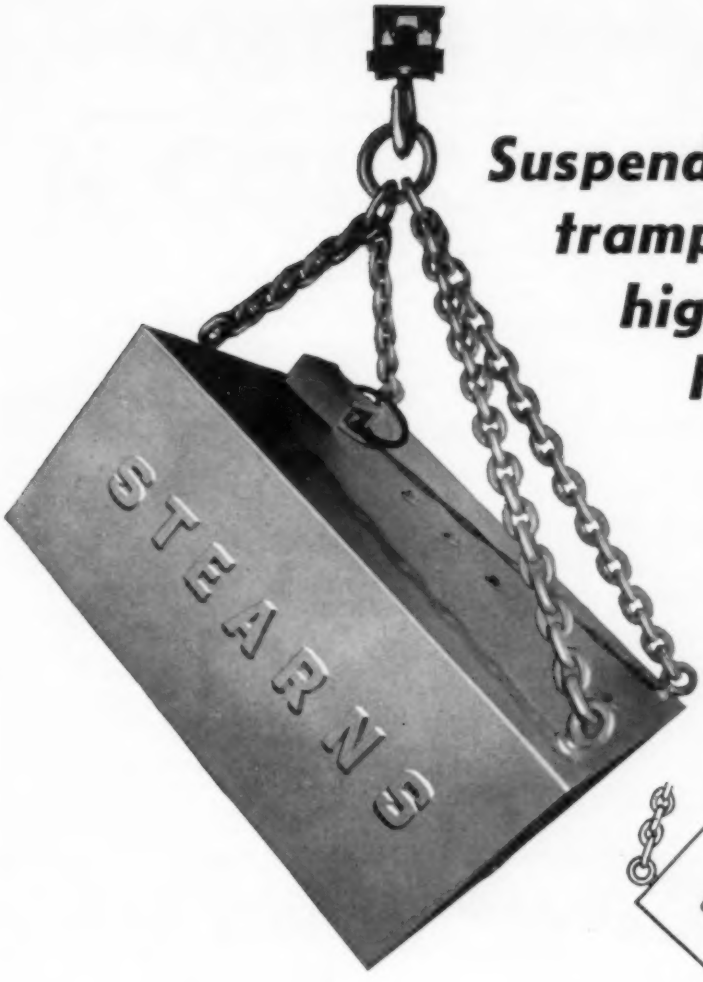
New Clark Equipment Dealers

New dealers for its Michigan line of tractor shovels and excavator cranes have been appointed by the Construction Machinery Div., Clark Equipment Co., Benton Harbor, Mich., as follows: Stephens Equipment Co., Des Moines, for central Iowa; R. E. Common Equipment Co., Peoria, for west-central Illinois; Machinery Outlet, Inc., Wichita, for central and western Kansas; Totem Equipment Co., Seattle, for Washington (except for five southwest counties) and northern Idaho; and West Virginia Tractor & Equipment Co., Charlestown, for West Virginia, with the exception of six counties.

Naylor Heads Fairbanks Co.

Alexander L. Naylor has been elected president of the Fairbanks Co., New

Suspended magnet solves tramp iron problem on high-speed conveyor handling wet coal



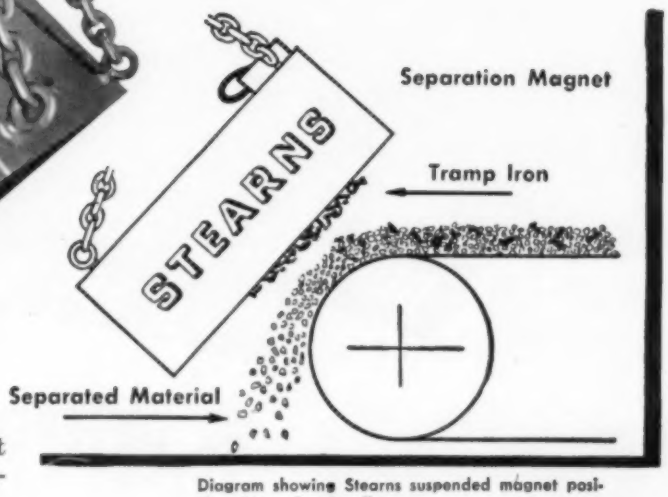


Diagram showing Stearns suspended magnet positioned over head pulley.

Stearns rectangular suspended separation magnet cures tramp iron headaches on fast-moving conveyors, particularly when material is wet.

First, the magnet's length permits its powerful, deep pulling force to work over a large area . . . dig out embedded tramp iron . . . prevent "sneak throughs." Second, the upward movement of iron to the magnet, shakes off wet, clinging material, eliminating costly waste.

Greater Flexibility

Stearns suspended magnet overcomes space limitations because it can be placed over the head pulley, or anywhere along the belt. Sometimes it's set up to remove tramp iron before material moves onto the conveyor — thus safeguarding the belt from damage. In many processing operations, Stearns suspended magnets are used ahead of magnetic pulleys to insure double protection for crushers and other expensive equipment.

Custom-Built

Magnetic specialists at Stearns design and build rectangular or circular suspended magnets, electro or permanent magnetic pulleys in standard sizes, or to your individual specifications. Get complete details from your Stearns representative or write for bulletin 25D.

Check these advantages

- All-welded, moisture-proof construction
- No moving parts that require replacing
- Single coil construction for magnetic field stability
- Leads and terminals fully protected against abrasion
- Vacuum-impregnated windings for long life, dependable operation

MAGNETIC EQUIPMENT FOR ALL INDUSTRY

STEARNS MAGNETS

STEARNS MAGNETIC, INC.; 661 S. 28th St., Milwaukee 46, Wis.

York. Executive vice president of the company for the past 10 yr, Mr. Naylor previously was assistant to the president. He succeeds his father, George M. Naylor, who was president from 1924 until his death last April.

Gar Wood Names Sales Officials

The appointment of Milton G. Peck as vice president and director of sales and advertising, Gar Wood Industries, Inc., Wayne, Mich., has been announced by E. F. Fisher, president. Mr. Peck for the past 4½ yr was sales manager of the electric industrial truck division of Clark Equipment Co., Battle Creek, Mich., and for 26 yr was sales manager of the industrial truck division of Yale & Towne Mfg. Co., Philadelphia. Harold H. Hippler has been named general sales manager, according to an announcement by Mr. Peck. Associated with Gar Wood Industries since 1924, Mr. Hippler has filled various sales posts and since 1954 has been assistant director of sales and service administration.

C & D Batteries Adds Plant

C & D Batteries, Inc., Conshohocken, Pa., began operations at its new Attica, Ind., plant in June, manufacturing a complete line of industrial storage batteries, according to J. F. Rittenhouse, C & D executive vice president. C & D's leasing of the Attica plant is another step in the 50-yr-old firm's expansion program, which began with the rebuilding and modernization of its main Conshohocken plant last November, and the opening of an export division in Philadelphia in February.

Koppers Research Promotes

Five personnel changes in the fuels processing section, Koppers Co., Inc., Pittsburgh, have been announced by Dr. E. W. Volkmann, manager, research department. Those promoted and their title include: G. V. McGurl, manager, fuels processing section; E. V. Harlow, assistant manager; Dr. E. H. Dobratz, manager, high-pressure branch; H. B. Smith Jr., assistant manager of the branch; and J. F. Farnsworth, manager, gasification branch. Mr. McGurl replaces Dr. E. E. Donath, recently appointed manager, technical appraisal and planning section.

Heads Clark Axle Sales

Robert C. Andrews has been appointed sales manager for Clark Equipment Co.'s Axle Div., Buchanan, Mich., C. A. Fenn, divisional manager, has announced. For the past 15 yr, Mr. Andrews has been with Vickers, Inc., in production, sales and sales-coordinating engineering.

And For Your Information . . . .

Firth Sterling, Inc., Pittsburgh, has appointed Mole-Bits Co. as an authorized distributor for its line of Firthite "Blue Bit" mining tools in the Johnstown, Pa., area as another step to broaden and intensify its coverage of the coal mining

DUMPING 5 CARS IN 5 SECONDS

At the Trail, British Columbia, Lead and Zinc Mine, owned and operated by The Consolidated Mining and Smelting Co. of Canada, Ltd.

WITH THE DIFFERENTIAL ROTARY DUMPER

It's everyday procedure at this Canadian lead and zinc mine. A touch of the air control starts the dumping action and the law of gravity takes over. It's as simple as that!

Simplicity in design, speedy operation, low upkeep, safety, low initial cost and ease of erection . . . these are some of the reasons why you are seeing more and more single and multiple Differential Dumpers in the mining world.

Our engineering service is at your service!

DIFFERENTIAL PRODUCTS INCLUDE

Locomotives, Mine Cars, Mine Supply Cars, Rock Larries, Mantrip Cars, Air Dump Cars, Dumping Devices and Complete Haulage Systems.

DIFFERENTIAL STEEL CAR COMPANY

FINDLAY, OHIO

SINCE 1915 — PIONEERS IN HAULAGE EQUIPMENT

I'M SOLD ON

WEDGE WIRE SCREEN GUARDS

They're Rugged, Dependable, and give Long Life Performance

The screen guard is built into the screen and the guard bars permit only the finer particles to pass over the screen. This item can be furnished in special sizes to your requirements in practically any type of long wearing metal.

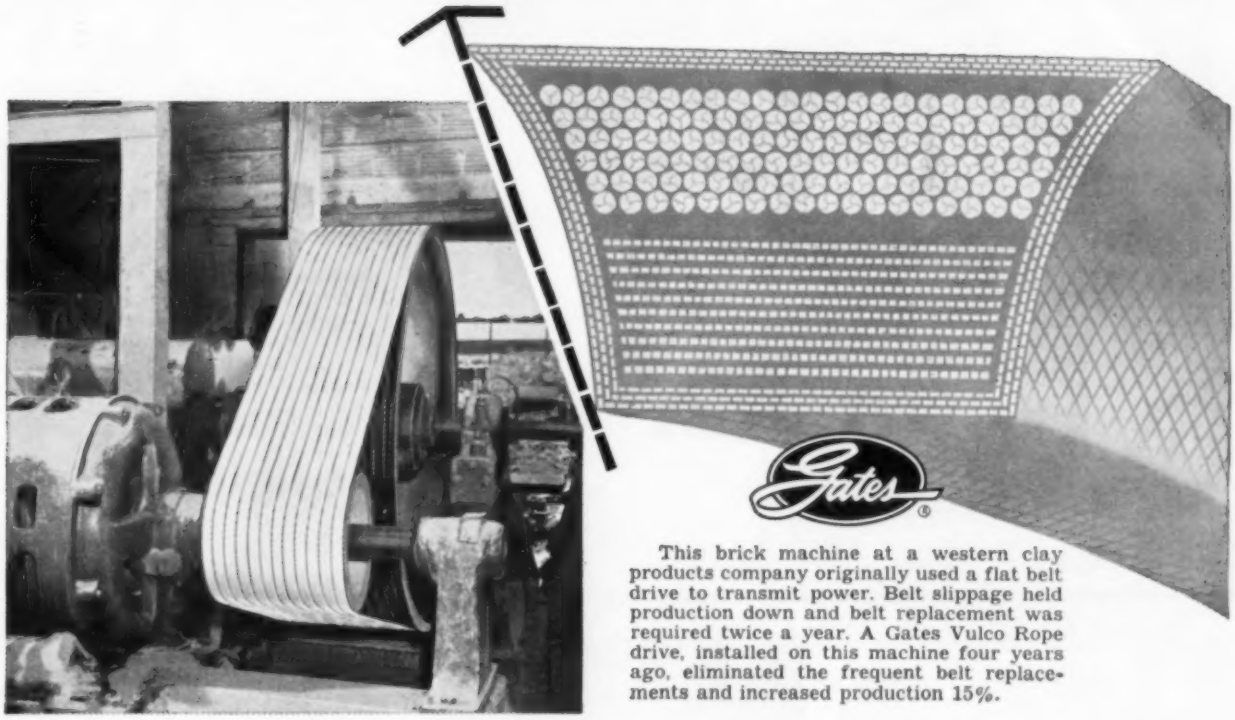
Complete literature is available. These screen guards are non-clogging, non-blinding, and are strong, rigid, uniform and extremely economical.

Wedge-Wire CORPORATION

Gas Street at Nickle Plate R. R.

Wellington, Ohio

"Secret" of *lower* belt costs is concave sides



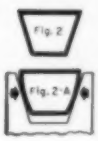
This brick machine at a western clay products company originally used a flat belt drive to transmit power. Belt slippage held production down and belt replacement was required twice a year. A Gates Vulco Rope drive, installed on this machine four years ago, eliminated the frequent belt replacements and increased production 15%.

Plants that keep track of costs on drives know this: they get longer wear at *lower cost per year of service* when they specify Gates Vulco Ropes—the V-Belts with *concave sides.*

Here's WHY concave sides keep belt costs down:

When the Gates belt is bent around the sheave, the *precisely engineered* concave sides (Fig. 1) fill out and become straight (Fig. 1-A). Thus the belt makes uniform contact with the sides of the pulley.

This full, uniform contact assures *even distribution of wear.* Naturally, *even wear* means *longer wear.* And longer wear cuts belt replacement costs...reduces down time...contributes to profits.



Prove to yourself the value of concave sides

Bend a straight-sided belt (Fig. 2) and feel the sides *bulge out* around the bend. You see immediately that the bulging sides prevent an even fit in the pulley groove (Fig. 2-A). Uneven contact causes faster wear...increases belt replacement costs.

Reduce costs and down time for belt replacements—specify Gates Vulco Rope Drives—the V-Belt with *concave sides* (U.S. Patent 1813698). The Gates Rubber Co., Denver, Colorado—*World's Largest Maker of V-Belts.*

Gates Engineering Offices and Distributor Stocks are located in all industrial centers of the United States and Canada, and in 70 other countries throughout the world.

TPA 48-B

GATES VULCO ROPE DRIVES

Giving Coal The Shakes . . .

Now you can screen coal easier, faster and with less time out due to blinding. Here's the secret: Use Hendrick Perforated Plate on your vibrating and shaking screens. For Hendrick can often mean the difference between profit and loss in coal preparation. Hendrick Perforated Metal Plate stands up under continuous heavy-duty usage . . . screens last longer and openings remain uniform to assure accurate sizing. For information on the flat, corrugated or stepped shape and the size of perforation that is best suited to your particular needs, write to Hendrick today.

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41 DUNDAFF STREET, CARBONDALE, PA.
Sales Offices in Principal Cities

PERFORATED METAL • PERFORATED METAL SCREENS • WEDGE-SLOT AND WEDGE WIRE • ARCHITECTURAL GRILLES • MITCO OPEN STEEL FLOORING • SHUR-SITE TREADS • ARMORGRIDS

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Regardless of the type of Page Automatic Bucket you buy—Lightweight, Medium Duty, Heavy Duty, Perforated or Slat—a Page is guaranteed to load faster and carry out more material than ordinary old style buckets.

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Clearing Post Office, Chicago 38, Ill.

industry. The Mole-Bits Co. will cover the counties of Armstrong, Cambria, Clearfield, Indiana, Somerset and Westmoreland.

Euclid Div., General Motors Corp., has named Nash Euclid Equipment Sales, Inc., Salem, Va., as authorized dealer for Virginia except for northeastern counties covered by L. B. Smith, Inc., of Baltimore, according to an announcement by J. W. Bloomquist, domestic sales manager. H. Wilson Nash heads the new dealership, which will handle sales and service of the complete Euclid line.

Pat E. Dougherty has been appointed district sales representative for Leschen Wire Rope Div., H. K. Porter Co., Inc., covering Washington, western Idaho and northwestern Montana. Previously a civil engineer for 15 yr, Mr. Dougherty has had extensive experience selling wire rope and other products since the war.

Baldwin-Lima-Hamilton Corp., Construction Equipment Div., Lima, Ohio, has appointed Hawkeye Machinery Co., Inc., Des Moines, Iowa, distributor for the Lima line and Austin-Western crushing equipment, covering central and eastern Iowa; and Bert Smith Road Machinery Co., Inc., distributor for the Lima line, covering Oklahoma with the exception of six extreme eastern counties.

The Heil Co., Body & Hoist Div., Milwaukee, has appointed the Alabama Truck Equipment Co., Birmingham, Ala., distributor for the northern counties of Alabama, according to W. A. Carlson, sales manager of the division.

The appointment of P. B. Patteson as manager, industrial sales division, Remington Arms Co., Inc., Bridgeport, Conn., succeeding Paul Hickman, transferred to the research and development department, has been announced by Dewey Godfrey, vice president and director of sales. Mr. Patteson, formerly manager, Western sales region,. has been acting manager of the division for some months in the absence of Mr. Hickman, who has been on special assignment.

William J. Davies has been appointed to succeed Robert J. Laidlaw as district manager of Worthington Corp.'s Cleveland office, according to an announcement by William A. Meiter, general sales manager. With the company since 1937, Mr. Davies served as application and sales engineer in Buffalo from 1938 to 1942 and as sales engineer in Cleveland since 1942. Mr. Laidlaw, who is retiring because of ill health, joined Worthington in 1919 and has been district manager for the past 12 yr.

H. A. Wiley Jr. has been named manager, belting and packing sales, Quaker Pioneer Rubber Mills, Div. of H. K. Porter Co., Inc., San Francisco. Formerly associated with one of the major eastern rubber companies, Mr. Wiley came to Quaker Pioneer in 1950 as a member of its production department.

Rome Cable Corp., Rome, N. Y., has completed a one-story brick and steel building adding 90,000 sq ft of new shipping and storage space to its facili-

61,167 gauges . . . to deliver your Crane Valves 100% quality inspected

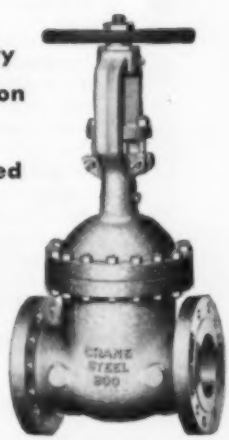
Care-how! A newly coined catch-phrase? Not at Crane! It is a rigidly-adhered-to principle of quality control—100 years old!

By way of example, the Crane technician in the photograph is checking the taper, size and guide slot alignment on gate valve discs. Every disc must correspond to the setting of the indicators—to tolerances of .001 inch plus or minus, on the taper, and .008 inch on the alignment of the slot guides. And Crane uses 61,167 gauges to insure dimensional accuracy.

Why this Care-how? To assure you of smoother, longer lasting valve operation, with lower maintenance and repair costs.

There you have the reasons why knowing and thrifty buyers prefer Crane valves . . . why industry uses more Crane valves than any other make! And the reasons why you should always buy Crane. Crane Co., General Offices, 836 S. Michigan Ave., Chicago 5, Illinois. Branches and Wholesalers serving all industrial areas.

Better Quality
Bigger Selection
in Valves
for Every Need



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VALVES • FITTINGS • PIPE
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CRANE'S FIRST CENTURY...1855-1955

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CONTINUOUS CENTRIFUGAL means

1 BETTER COAL DRYING

. . . so much better, in fact, that C-M-I Dryers are piling up new records for economy and efficiency in preliminary dewatering operations.

. . . so much better that C-M-I Dryers are not only replacing costly heat drying in preliminary dewatering but, in many cases, are eliminating entirely the need for heat drying.

2 BETTER SLURRY RECOVERY

Marketable coal—thousands of tons of it—is being reclaimed from slurry by C-M-I Continuous Coal Dryers Dryers . . . at a cost so low as to make this operation extremely profitable. Yes—slurry reclamation CAN be profitable—when done the C-M-I way. Find out HOW and WHY . . .

SEND FOR FREE BROCHURE

C-M-I Centrifugal DRYERS

CENTRIFUGAL & MECHANICAL INDUSTRIES, INC.
146 PRESIDENT ST.
ST. LOUIS 18, MO.

ties. Erection of this new building will permit realignment of certain manufacturing facilities toward broadening of the company's product line and creating new efficiencies, it reports.

The Hewson Co., Inc., Newark, N. J., has appointed J. W. Wollett, 34 Sunnyfield Dr., R. D. 2., Bridgeville, Pa., as representative for sales, field application and servicing of its line in West Virginia and western Pennsylvania.

The Braun line of laboratory testing apparatus has been acquired by Bico, Inc., Burbank, Calif., marketing the line under the trade name of Bico.

The Galion Allsteel Body Co., Galion, Ohio, has named the Acme Spring & Equipment Co., Charleston, W. Va., distributor in central West Virginia. Galion sales in the Charleston territory will be supervised by S. J. Kish, general manager, and R. Brown, sales manager.

New Consulting Firms Offer Mining Services

Fraser, Weir & Associates, Inc., has opened new offices at 20 N. Wacker Dr., Chicago 6, as consultants in industrial engineering, with special emphasis on installation of "Controlled Maintenance Systems" for all types of mining, industrial and transportation facilities. The services and techniques being offered were developed by H. H. Fraser & Associates Ltd., of South Africa, which successfully introduced these methods of engineered maintenance into the mines, plants, factories and shops of a wide variety of clients in Africa and the Near East. Now affiliated with the Paul Weir Co., the new organization will make its engineering services available to all industries, both in the U. S. and abroad. Experience has shown that the successful development of a Controlled Maintenance System not only radically reduces maintenance costs, but also decreases production down time, improves safety and quality and prevents abnormal depreciation of equipment, the company reports.

Theodore Barry, Pacific Coast consultant, has formed a new company, Theodore Barry & Associates, with offices at 3055 Wilshire Blvd., Los Angeles. The new firm is currently serving clients in the fields of wage plans, management audits, organization, production planning, executive recruitment, marketing, cost controls and foreman training. Mr. Barry was formerly a partner in the firm of Barry & Co., and previously a consultant with Albert Ramond & Associates, Chicago. He and his associates have consulting experience with over 70 companies in the manufacturing, agriculture, mining, retailing and institutional fields.

Booklet Sells Industry To Graduating Students

A new brochure to encourage graduating high school and college seniors to choose an engineering career in the coal mining industry has been announced by the National Coal Association. "Engi-

Specialists in Economy for BRONZE REPLACEMENT PARTS

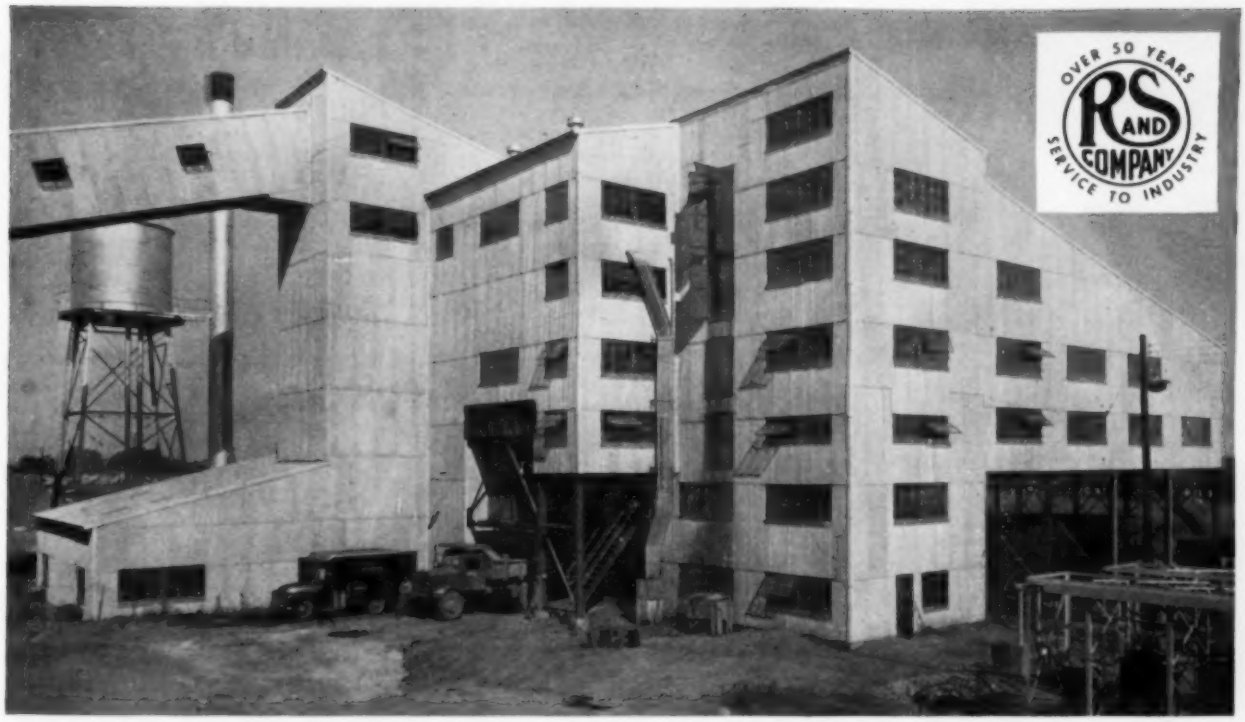
HI-QUALITY BRONZE MACHINED TO A PERFECT FIT

Flood City specializes in making bronze bearings and replacement parts from a superior grade of hard, long-wearing bronze . . . machined by experts to a perfect fit!

Standard bronze replacement parts for all types of mining equipment are carried in stock and prompt delivery can be made from both Johnstown and Charleston, W. Va. Good service is also available for special parts and bearings made to your specifications.

Our specialization results in greater economy for you . . . always specify Flood City Bronze Replacement Parts.

FLOOD CITY
BRASS & ELECTRIC CO.
JOHNSTOWN, PA.
SALES AGENT:
KANAWHA RAIL & MACHINERY CO.
CHARLESTON, W. VA.



Largest Commercial Producing Mine in the Nation Utilizes Modern Roberts & Schaefer Processing Plant

Production records for 1954 show that Peabody Coal Co.'s Mine No. 10 at Pawnee, Illinois delivered over 2½ million tons of coal to lead the nation's commercial mines in output. The exact production figure is 2,645,923 tons mined at the rate of 16,000 tons per day.

This outstanding record was accomplished through complete mechanization underground. The modern processing plant designed and built by Roberts and Schaefer Company also played an important part in making this record. The slope conveyor, which delivers 1,000 tons of coal per hour, feeds the preparation plant which washes and prepares the coal for the ultimate market.

Like all other R & S preparation plants, this was designed by R & S engineers and built by R & S field crews to meet the specific requirements of the Peabody Coal Co.

R & S preparation plant knowledge and experience are extensive and are attested by many successful installations of different types in both this country and abroad. Phone, wire or write for consultation without obligation.

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Stick Free
CORE SHELL
multiplies
mechanical operating life
5 to 6 times

PRE-SET TAMPER PROOF
TIMER-RELAY

A unique one-piece drawn core-shell with embossed guide points increases the mechanical operating life of the Durakool Timer-Relay five to six times, practically putting it in a "fail-safe" class. These relays are available in single or multiple units with single unit capacities of 10, 30 and 60 amperes. Time delays from 0.15 to 20 seconds—any operate-release time combination. These new 1955 relays are now in production —no extra cost.

GUARANTEED FOR AC-DC APPLICATION
and:

- No plunger sticking
- No chatter
- Quiet operation
- No double contacting

See telephone directory for local distributor, or write.

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Durakool
ALL-STEEL MERCURY
Timers

neers are needed; high school, as well as college, graduates can find a place in the coal industry at high wages comparable to any other, and higher than most," states the 10-p brochure entitled "A Fine Future in the Coal Mining Industry Is Waiting for You." More than 10,000 copies of the pamphlet are being distributed through 30 colleges in 24 states offering mining engineering courses, and through coal producers and other sources.

Henry C. Woods, chairman of the board, Sahara Coal Co., Inc., and chairman of the NCA Vocational Training and Education Committee, reports that 99 scholarships established by the coal industry, with a total annual value of $44,265, are available in nine states for coal mining engineer candidates. In addition, there are available various awards, loan funds and scholarships from non-coal industry sponsors.

Copies of the brochure may be obtained from M. D. Cooper, director of Mining Engineering Education, National Coal Association, 802 Southern Bldg., Washington 5, D. C., or through members of the NCA Vocational Training and Education Committee.

New Books for Coal Men

Coal-Preparation Texts for Adult Vocational Classes

Coal Preparation, Parts I, II, and III, edited by Howard W. Decker, formerly instructor, Mineral Industries Extension Services, Pennsylvania State University, provides a comprehensive textbook of coal-preparation practices and equipment, beginning with basic physics and chemistry and following through in coal-sampling, analysis of coals and performing washability studies in Part I. Part II is concerned with processes such as crushing and screening and with the several washing methods and final treatment. Part III treats plant maintenance and flow sheet studies in particular. The set of books is written for use in the adult-education classes conducted by Penn State's Mineral Industries Extension Services. *610 pp, total; 8½x11-in, paperbound. Part I, $2; Part II, $3; Part III, $3, from General Extension Stores, Pennsylvania State University, University Park, Pa. Add 1% state sales tax on Pennsylvania sales.*

Coal-Sampling Theory

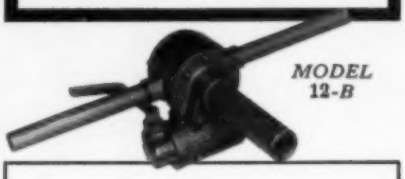
Symposium on Coal Sampling covers the historical background of the theoretical basis of coal sampling, reports on recent British work, discusses theoretical equation of variance applicable to coal sampling and gives the results of experimental investigations. *ASTM Special Technical Publications No. 162. 156 pp. 6x9-in; paper. $2.75, American Society of Testing Materials, 1916 Race St., Philadelphia 3, Pa.*

Preventing Electrical Fires

Preventing Coal-Mine Fires Caused by Electrical Equipment, by C. L. Brown,

Teamed up for...
Faster, Safer
DRILLING!

SCHROEDER
Hydraulic
COAL DRILL



Safe, dependable, fast drilling with complete safety . . . no spark, no kick . . . all electrical hazards removed yards from drill. Light weight Model 12-B is powered from hydraulic systems of standard mining equipment or can be furnished with Schroeder Tricycle Hydraulic Mobile Power Unit. Features minimum of operating parts and reduced maintenance costs.

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For hydraulic hand-held coal drills, assures faster drilling with less effort as a result of . . .

1. Reduced area of penetration for ease of feed.
2. Greater clearances reduce drag.
3. Heat treated forged steel bit body.
4. Tough carbide tips hold cutting edge longer.

Send today for details and prices.

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HYDRAULIC, ELECTRIC & PNEUMATIC
MINING EQUIPMENT

OC-18 strips more yards per dollar... extra power, high speeds do the trick!

On this strip mine operation an Oliver OC-18 with cable dozer was used to remove overburden. Long, heavy dozing runs were needed to clear the site. The OC-18 with its fast, powerful dozing gear and high-speed reverse proved the most profitable choice.

The high-stepping diesel engine in the OC-18 features an exceptional torque span—lugging power steps up as the tractor slows under load. In first gear, the OC-18 gives 31,000 drawbar pounds' pull at 1½ miles per hour! This rugged tractor can move more yards in less time. And with a high reverse of 3½ miles per hour, it will cut hours and dollars from your dozing cycle.

The OC-18 gives you more for your money, too. Balanced design eliminates dead weight... puts every ounce of power to work at lowest fuel cost. In fact, the OC-18 has the greatest power-to-weight ratio of any tractor in the 133 drawbar h.p. class.

For sheer operating ease and maneuverability, the OC-18's finger-tip air steering and convenient controls take second to none. Test this fast, powerful tractor yourself. Call or visit your Oliver Industrial Distributor for a demonstration.

THE OLIVER CORPORATION

400 West Madison Street, Chicago 6, Illinois
a complete line of industrial wheel and crawler tractors

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SAFEST
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You Can Buy!

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SAFETY
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DROP FORGED — HEAT TREATED
½ ton to 15 ton capacity

To help you order from your local distributor send for complete catalog.

THE
THOMAS LAUGHLIN DIVISION
American Hoist and Derrick Co.
DEPT. 42G, Portland, Maine

Please send me catalog of your complete wire rope and chain fitting line.

Name.....
Company.....
Address.....
City.....Zone....State.....

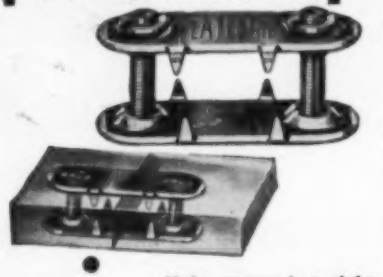
FATHER AND SON, students in night mining classes, College of Engineering, University of Maryland, receive awards for best suggestions for reducing accidents caused by roof falls. James Murphy (second from left) receives top award from Richard Johnson, Mine Safety Appliances Co.; William H. Murphy (third from left) accepts runner-up prize from John Dauster, MSA.

Dinner Climaxes Night Mining Classes

OVER 150 members and guests gathered at the 32nd annual dinner-meeting of the night mining classes, College of Engineering, University of Maryland, held June 7 at the Southern High School, Oakland, Md. W. W. Dawson was toastmaster and Gov. Theodore R. McKeldin, of Maryland, was principal speaker. Other speakers included Frank Powers, director, Maryland Bureau of Mines; Messrs. Mayo and Morgan, UMWA; John Daugherty, USBM; Dwight Jacobus, Maryland Dept. of Education; G. R. Spindler, director, School of Mines, University of West Virginia; and Louis C. Hutson, College of Engineering, University of Maryland.

At the conclusion of the dinner, Mr. Hutson announced that a father and son had been selected as the winners in the contest for the best suggestion for reducing accidents caused by roof falls. James Murphy was awarded a flame safety lamp as first prize and his father, William H. Murphy, was given a first-aid kit as second prize. The top award, made by Richard Johnson, and second place prize, presented by John Dauster, were on behalf of Mine Safety Appliances Co.

PLATEGRIP
PLATE FASTENERS FOR CONVEYOR BELTS



Make strong dust-tight, water-tight joints in belts of any width. Special design spreads tension uniformly across belt, allow natural troughing of belt and assures smooth operation over flat, crowned or take-up pulleys. Sizes for belts of ¼" to 1½" thickness. Write for Catalog Sheet.

ARMSTRONG BRAY & CO.
53[illegible] Northwest Highway, CHICAGO 30, U. S. A.

BOOKS . . . From p 146

describes methods that can be used to reduce electrical fire hazards. Results of four routine studies of underground power-distribution systems made by the USBM are given in detail. It also describes modern coal-mine power-distribution systems and electrical equipment and tells how main power circuits and secondary branches can be protected. *I. C. 7716. USBM, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa.*

UMWA Effects on the Industry

The Union and the Coal Industry, by Morton S. Baratz. An appraisal of the effects of the policies of the UMWA on the coal industry and an analysis of the impact of unionism on wages, competition between firms and coal-producing regions and the consumption of competing fuels. *Yale Studies in Economics, Vol. 4, 170 pp. No price quoted. Yale University Press, New Haven, Conn.*

11-RU Universal Cutter, courtesy Joy Manufacturing Co.

MORE BITS in the LINE...

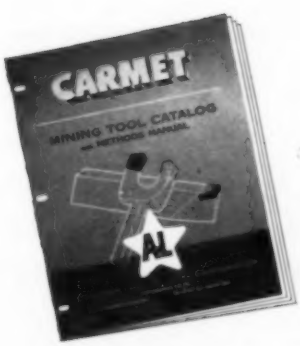
A BETTER FIT in the MINE!

★ 20 Different Styles of Cutter Bits

★ 2 Styles of Finger Bits

★ 2 Styles of Roof Bolting Bits

★ 3 Styles of Coal Drill Bits



Write for your copy of the CARMET MINING TOOL CATALOG

This informative 16-page booklet gives complete data, sizes, etc. on all styles of Carmet carbide-tipped cutter and drill bits. Also included is a valuable methods manual on reconditioning methods and equipment. Your copy gladly sent free on request.

ADDRESS DEPT. CA-67

The unequalled range of selection that is available to you in Carmet carbide-tipped coal cutter and drill bits simply means this: that you can match up your bits just that much more closely with the actual conditions you have!

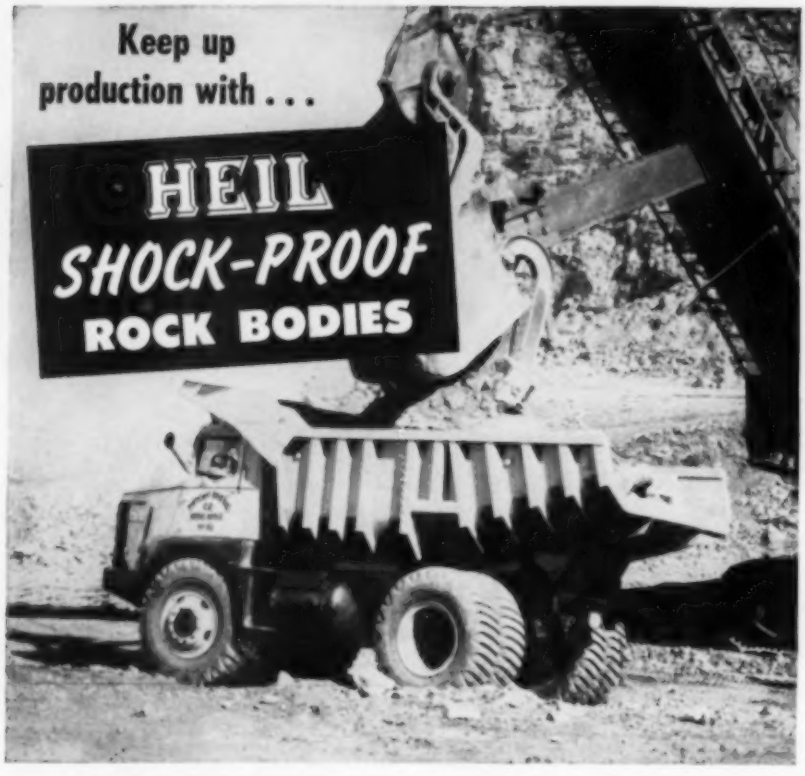
And *that* means you can profit by the greatest increase in cutting speed and tons cut per bit setting—the greatest reduction in down time and in overall bit cost per ton—that is possible for you to secure *anywhere* with carbide bits. What's more, you have added assurance of top efficiency in the overlaying cap of steel that *double-bonds* the carbide tip of each Carmet cutter bit firmly in its seat. That's a feature which Carmet *originated*. It operates to protect you against tip loss, and to permit cutting on both sides as well as in front—eliminating side drag, reducing power consumption, etc.

Even the shank steel in Carmet carbide bits is a product of quality control: tough enough to insure against bending or breakage, yet of a hardness to permit set screw locking. ● Just *try* Carmet bits—see for yourself what they'll do! We'll be glad to cooperate with you in proving their advantages on *your* job. ***Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Avenues, Detroit 20, Michigan.***

The Original DOUBLE-BONDED Carbide Bit

CARMET® AL

W&D 5412



Here's How . . .

Dump a big dipper full of coal or overburden into a Heil Rock Body. Drop the heaviest load your bucket can hold into it. Give it the roughest shock treatment of a rough industry.

Production rolls merrily along!

As long as the trucks under them move, Heil Shock-Proof Rock Bodies are in your production line, because they're built to stay on the job and out of the shop.

The 2" hardwood cushion sandwiched between body bottom and wearing plate absorbs load shock. Bodies fabricated of ¼" (or heavier) steel plate, rigidly reinforced by box member ribs, assure "no sag" strength and stamina. For cold weather work or handling sticky gumbo, heated floor construction can be supplied.

HEIL HEAVY-DUTY HOISTS

Hoist performance is just as important to keeping up production as shock-proof bodies. Heil Hoists are matched to Heil bodies for always dependable, always economical durability.

Call your Heil distributor for proof of Heil Body and Hoist production in the field.

Always Specify

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Fire Prevention

Fire Control is an extensively revised manual presenting in greater detail accepted procedures for handing fire-protection equipment and methods of preventing industrial fires. It is designed to serve as a guide for plant management, supervisors and other personnel concerned with fire safety. *10c. Association of Casualty and Surety Companies, Accident Prevention Dept., 60 John St., New York 38.*

Open Pit . . . From p 116

equipment will operate reliably and smoothly.

4. With more dependable power at hand, operators may be expected to produce maximum yardage.

Noting that investigation of complaints of poor performance often leads to a discovery that low voltage is the underlying cause of the trouble, Mr. Stoetzel pointed out that the natural course of events led to the use of 2,300-v power in applications where formerly 480- or 600-v systems had been used. A motor rated at 400 hp is not at all unusual now, and operating distances from substations of as much as 20,000 ft have recently come under study. Pointing out further that the new "super shovel" now being erected has nearly 5,000 hp in drive motors, Mr. Stoetzel declared it would be futile to think of using 4,160-v transmission in such instances. The use of higher voltages for the larger machines, however, makes it necessary to maintain perhaps three different distribution voltages in the pit, such as 440 for pumps and so on, 4,160 for loading shovels, and 6,900 for the stripping machine.

NEW STEP AHEAD

"Higher distribution voltage for strip-mine operation is simply another progressive step in making strip mining more efficient," Mr. Weis said in pointing out that such a change is necessary to satisfactorily operate the mammoth machines now in the works.

Turning to the problems which might be encountered, Mr. Weis stated that there should be no major difficulties as long as sufficient space is available to obtain the necessary clearances required for the higher voltage. The collector-ring assemblies at the cable reel and between upper and lower frames would of course have to be made with greater contact areas, insulation will have to be thicker, and more distance between current-carrying units will be necessary.

Dependable transformers and switchgear for 6,900-v service have been available for years, Mr. Weis declared, in explaining that now the step to 6,900 v is a logical one, rather than trying to go on to some higher potential.

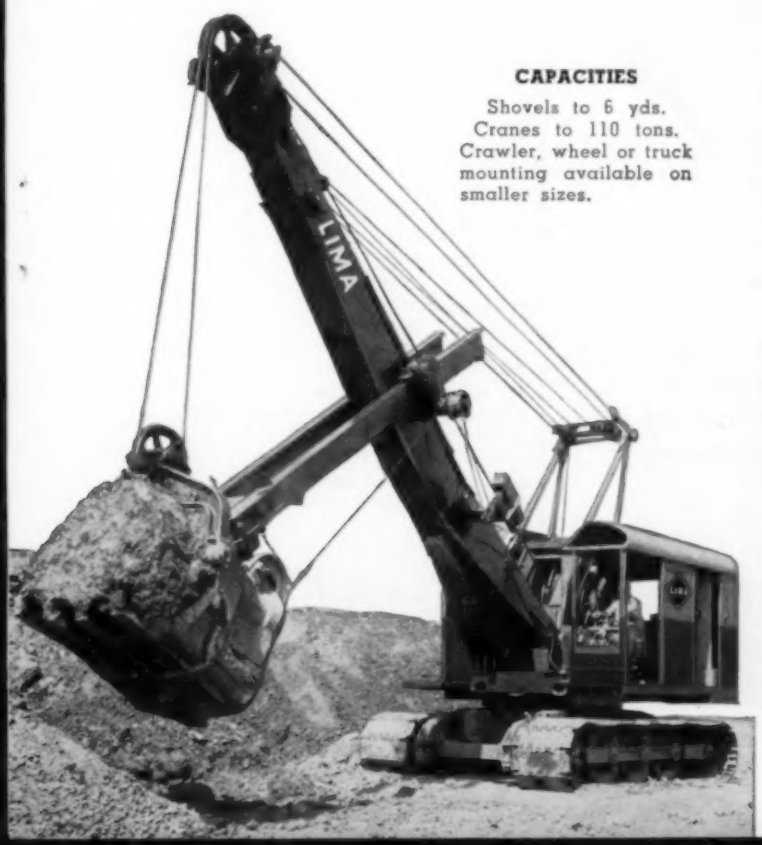
PORTABLE CABLES FOR HIGH-VOLTAGE SERVICE

Protection of personnel from the hazard of electric shock is of paramount importance in design of electric cables, Mr. Plass declared in making the point, how-

LIMA'S new Electric Power Unit eliminates stalls, won't burn out

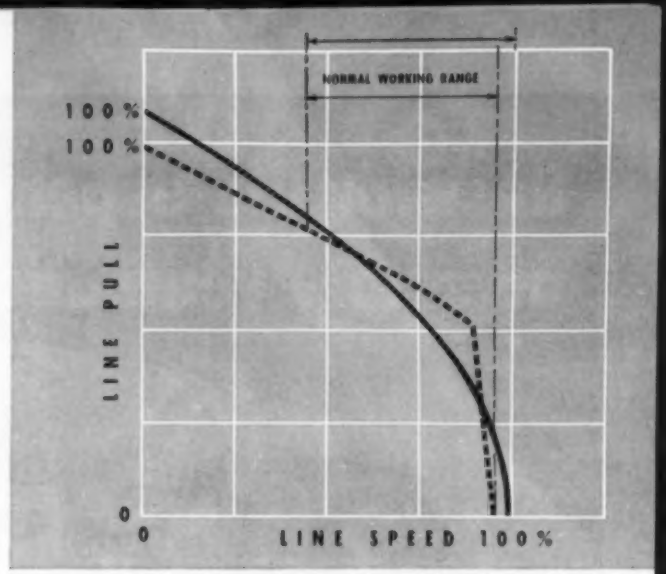
LIMA's new optional power unit matches, *electrically*, diesel-torque converter performance. It combines an AC motor with a single stage torque converter to adapt actual power output to work load demand—at constant motor speed. Thus, you get power on demand through a wide operating range . . . and the motor will not stall or burn out in heavy load operation.

Just check the performance curves —— They make it clear that LIMA's new electric power unit is the perfect answer when your job calls for electrically powered machines. The new unit is available on every LIMA machine. It will pay you to get the full story today from your nearby LIMA distributor . . . or write: Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.



CAPACITIES

Shovels to 6 yds.
Cranes to 110 tons.
Crawler, wheel or truck mounting available on smaller sizes.

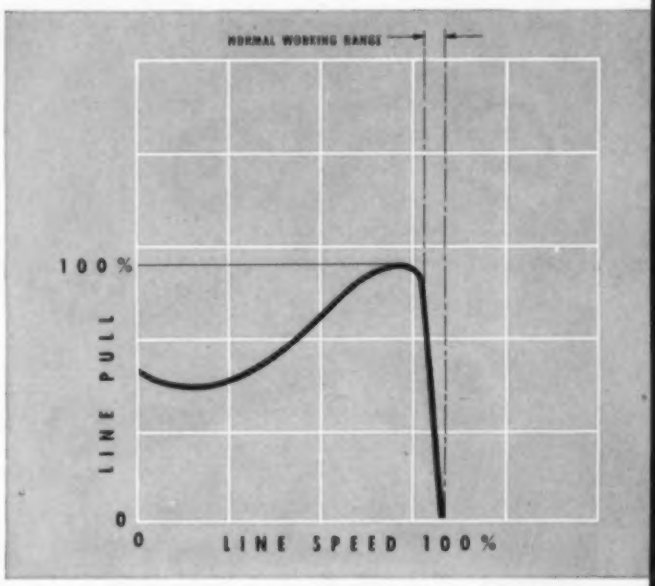


Power Performance of LIMA'S New Optional Unit:

A.C. Electric motor with torque converter drive [Diesel-torque converter curve (dotted line) shown for comparison]

With this drive, even under extreme loading, the motor will pull down in speed only a very small amount. It can never be stalled.

The line pull will constantly increase through a long pull down speed range, depending upon the load applied.



Power Performance: A.C. Electric motor with direct drive

The motor speed and torque varies as shown for line speed and pull.

With a pull down in speed of only 3% to 5%, torque rises too fast. The motor will stall quickly after peak torque is reached. Workable speed range is small, stalls are frequent.

BALDWIN · BLH · LIMA-HAMILTON

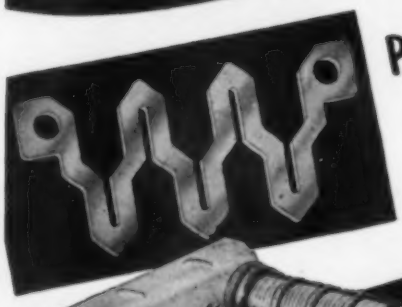
LIMA SHOVELS · CRANES
DRAGLINES · PULLSHOVELS

BALDWIN-LIMA-HAMILTON

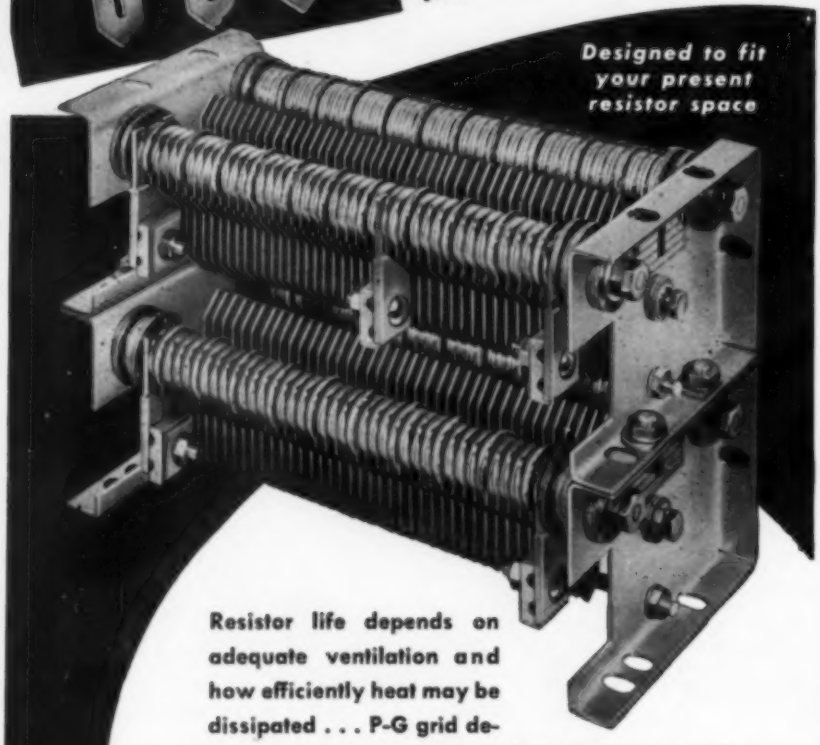
Construction Equipment Division · LIMA · OHIO · U. S. A.

DISTRIBUTORS IN PRINCIPAL CITIES OF THE WORLD

Resistor life depends on adequate ventilation...



Patented P-G Grid Design assures maximum ventilation



Designed to fit your present resistor space

Resistor life depends on adequate ventilation and how efficiently heat may be dissipated . . . P-G grid design equalizes the amount of air space surrounding each leg or loop to obtain even heat throughout the grid area. (Note illustration.) . . . Since heat is rapidly and evenly dissipated, hot spots fail to develop and longer resistor life is assured . . . For a nonbreakable resistor (only steel and mica used) specify P-G on your next application.

P-G *The Nonbreakable Steel Grid Resistor*

THE POST-GLOVER ELECTRIC COMPANY

•ESTABLISHED 1892•

221 WEST THIRD STREET, CINCINNATI 2, OHIO

ever, that the best cable design cannot eliminate the possibility of electrical hazards if other factors, such as, total ground-resistance values, fault-current limiting devices, periodic check testing of insulation and grounding systems and so on are ignored. One of the most important factors in designing safe cables is the incorporation of ground conductors of adequate size to keep voltage-drop within safe limits under fault conditions.

To obtain maximum insurance against hazards resulting from ground conductor failure, Mr. Plass continued, it is imperative that grounding continuity and resistance values be checked on a regular, supervised schedule. Internal or conductor shielding also is vital in cables for use at 5 kv and higher because this design offers protection against internal corona effects, increasing the dielectric breakdown value of the insulation in the order of 25%. Maximum cable life can be achieved through adequate provisions for lightning protection in overhead lines which may feed the portable cables.

Improved cable handling, better fault location through the use of presently available equipment and proper selection of cable to suit operating conditions can result in long cable life even in higher-voltage systems, Mr. Plass stated.

TERMINATING AND SPLICING IN HIGH-VOLTAGE SERVICE

The final speaker on the subject, Mr. Weichel, explained that splicing and terminating in cables designed for operation at any voltage level requires reasonably good workmanship and instruction, with a few more precautions thrown in at higher voltages. Procedures are essentially the same, though.

Turning to the practical aspects of the matter, Mr. Weichel said that some difficulty has been experienced with rubber-molded potheads, the ones most frequently used about strip mines. Many have failed as a result of corona cutting at the terminals of the shielding within the pothead.

It is good practice, Mr. Weichel continued, to employ stress cones on shielding. Above all, what is needed are standard methods which can be taught and followed by all cable-repairmen, and such standards may be set up after studying the methods used by railroads, power companies and others who have experience with 6,900-v distribution.

One possibility might be the manufacture of cable-connector assemblies having about 5 ft of cable attached at the factory. Mine labor then would only have to splice rather than terminate, and most companies have standard splicing methods and equipment.

Mr. Weichel concluded with his explanation of good splicing practices while showing detailed drawings of the methods employed.

The afternoon program included a report on the broad research activities in engineering by Prof. R. S. Green, executive director, Engineering Experiment Station at Ohio State, and a presentation on peacetime uses of atomic energy, including a new sound film produced by Westinghouse, by B. L. Lloyd, electric

A ***BARGAIN***

THAT BY-PASSES

THE DISTRIBUTOR

IS NO BARGAIN AT ALL!

In these times of mounting production costs, many purchasers of industrial supplies and materials are beginning to look upon their distributors as an extra expense. At first blush, it might *seem* cheaper to buy direct from the maker.

Actually, the distributor helps *both* the buyer and manufacturer save money. Like this:

He saves the buyer warehousing, handling and storage details, paperwork, provides an immediate single source of supply for thousands of items that industry needs, often in a hurry.

He saves the manufacturer the cost of heavy inventory maintenance in all parts of the country, the expense of an army of salesmen, a fleet of trains and trucks, and a staff of credit and collection experts. In a sense, your distributor represents a cooperative distribution facility that you share with all other firms in your area.

Next time you're tempted to get a direct quotation from the manufacturer, whether on a big or small item, figure out *all* the costs—not just the first cost—and you'll find you gain much more, yet in the long run pay no more, by utilizing the services of your distributor.

WICKWIRE ROPE

3151

A PRODUCT OF THE COLORADO FUEL AND IRON CORPORATION

"LUBRIPLATE, THE OUNCE OF PREVENTION"

says
VULCAN IRON WORKS, INC.
of Chicago, Ill.

—a leading manufacturer of pile driving and extracting equipment

"For many years we have used LUBRIPLATE Lubricants for shop assembly, and have recommended them to our customers through your LUBRIPLATE Tag Plan. Our experience shows that if the proper lubricants are used from the beginning, there are fewer problems and parts replacements later. We consider LUBRIPLATE to be the best possible ounce of prevention."—
H. G. Warrington, Vice-Pres.

REGARDLESS OF THE SIZE AND TYPE OF YOUR MACHINERY, LUBRIPLATE GREASE AND FLUID TYPE LUBRICANTS WILL IMPROVE ITS OPERATION AND REDUCE MAINTENANCE COSTS.

LUBRIPLATE is available in grease and fluid densities for every purpose... LUBRIPLATE H. D. S. MOTOR OIL meets today's exacting requirements for gasoline and diesel engines.

For nearest LUBRIPLATE distributor see Classified Telephone Directory. Send for free "LUBRIPLATE DATA BOOK"... a valuable treatise on lubrication. Write LUBRIPLATE DIVISION, Fiske Brothers Refining Co., Newark 5, N. J. or Toledo 5, Ohio.

COAL MEN ON THE JOB . . .

ISLAND CREEK COAL CO.—Advertising men and mine officials, looking over modern methods and equipment in Mine No. 25, are: Mike Marchich (left), mine engineer; Art Maynard, assistant director of preparation; Joe Danish, mine foreman; Lawrence C. Puchta, account executive, Stockton, West, Burkhart, Inc., advertising agency for Island Creek Coal Sales Co.; Fred Troy, commercial photographer; John A. Kerley, junior account executive; and J. Halton Green, advertising manager, Island Creek Coal Sales.

utility engineer, Westinghouse Electric Corp., Pittsburgh, Pa.

The group of more than 100 electrical and mechanical supervisors then was conducted through the plant of the National Electric Coil Co. at the invitation of Bailey Price, sales manager, and other National Coil officials.

Indiana Coal Mining Institute . . . From p 119

prevention. Seven mines have completed the program with 100% of employees participating. Four others now are being trained. Other projected safety activities include the formation of Holmes Safety Councils and chapters, more training in first aid and more widespread information on dust control and roof control.

In safety performance, Indiana lags its neighbors—Illinois and West Kentucky—but is showing a great improvement in recent experience. In 1953-54, for example, the Indiana deep-mine record was 775,000 tons produced per fatality; in Illinois, 1,206,000 tons per fatality; and in West Kentucky, 1,552,000 tons per fatality, Mr. Quenon reported. In the period from 1935 through 1954, however, the Indiana deep-mine record was 465,000 tons per fatality. The recent improvement is gratifying, Mr. Quenon said.

Final panel speaker was Charles A. Purcell, director, Indiana Bureau of Mines and Mining, Terre Haute, on minimum standards. Declaring that minimum does not mean "all that is required," Mr. Purcell explained that such standards should be considered a place to start from, not a place to stop.

Some of the advantages of standard roof-support plans—and it is difficult to assess all the benefits, Mr. Purcell said—are: (1) uniformly spaced timbers are less hazardous; (2) the roof-support phase of the work requires less supervision when the men have a definite plan of work firmly in mind.

Messrs. Quenon and Kirk, in closing the panel presentation, stressed the importance of co-operating with the national campaign devoted to the elimination of roof-fall accidents. (Turn to p 156)

JOY Safety Circuit Centers (S.C.C. units) are the Mining Industry's most inexpensive insurance against the damages that electrical overloads, shorts and ground leaks inflict on men, machines and trailing cable. Supplied with one through four power feeder outlets, in a wide variety of A.C. or D.C. ratings to match both low and high vein mining requirements.

- **Available in "Dust-resistant" or "explosion-tested" housings**
- **Compact construction utilizes aluminum to reduce weight**
- **Power outlets individually protected by circuit breakers**
- **External arms reset breakers, turn current off and on**
- **Safety ground trip provides insulation failure protection**
- **ISC Circuit (*) permits approved cable sectionalization**

Note: Explosion-tested designs have been approved for use in gaseous atmosphere by the U. S. Bureau of Mines and they stay permissible in operation; i.e., no protective covers or fuses must be removed or replaced. Simple movement of outside breaker control handle restores protected power to machinery after fault has been corrected.
(*)*ISC Circuit is optional on all designs.*

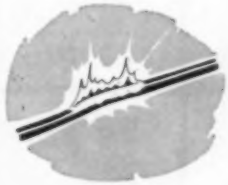
WRITE FOR BULLETIN

Yours without obligation . . . Eight pages of illustrations and descriptions.

Ask for Bulletin B39A

PROVIDE GROUND FAULT PROTECTION

Specially designed, foolproof core balance type ground protection available on all A.C. JOY S.C.C. units. Adjustable relay type available on D.C. units. Cuts power off lines when insulation failure permits dangerous flow of current to ground.



DECREASE FIRE HAZARDS

Circuit breakers cut current off feeder cable and machinery *in a split second* when dangerous shorts occur, preventing cable and machine insulation fires.

GUARD AGAINST EXPLOSIONS

JOY permissible style S.C.C. units (described at left) confine circuit breaking arc inside explosion-tested compartments. Available with intrinsically safe control (ISC) circuit that makes JOY connectors automatically drop load in opening process.

JOY MANUFACTURING COMPANY

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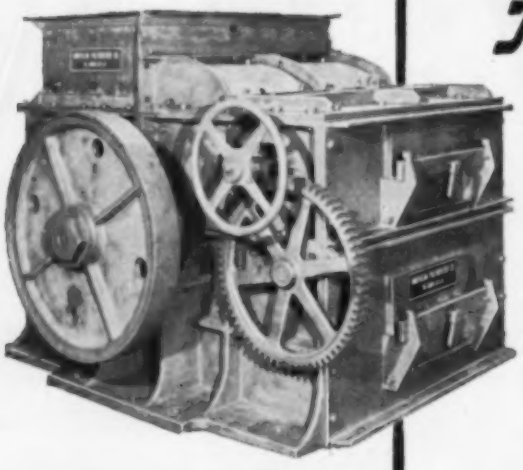
JOY

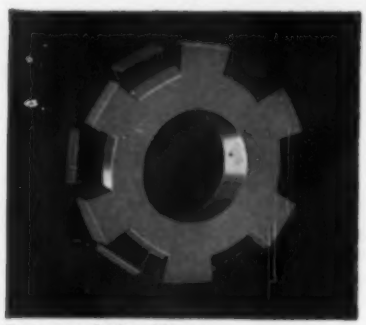
WORLD'S LARGEST MANUFACTURER OF UNDERGROUND MINING EQUIPMENT

W&D CL5630

BETTER COAL CRUSHING CONTROL BECAUSE IT'S BUILT BETTER . . .

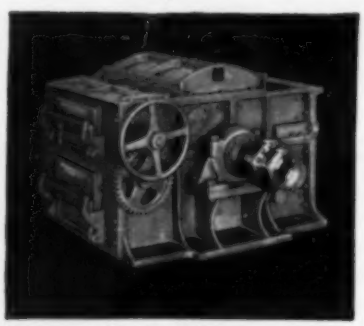
American ROLLING RING COAL CRUSHERS





1 Patented Shredder Ring

American-originated feature that splits coal instead of smashing it—for uniform sizing, minimum fines. Result: Americans run at slow speeds, with savings in power and maintenance. No cams, shear pins, toggles.



2 Heavy-Ribbed Steel Frame

Bearing pedestals are cast integrally with lower side frames. Sectional design for easy dismantling . . . abutting joints accurately machined and bolted together for dust-tight fit.

3 Completely Lined Crushing Chamber

Heavy, renewable liners . . . sectional for easy plate-at-a-time replacement . . . engineered to offer life-time protection to the frame.

4 Complete Accessibility to Adjustment and Parts

All adjustments external—even with crusher in motion. Rotor easily reached by removing top section. Rings readily reversed or replaced. Liners quickly reached, too, for periodical inspection.

American PULVERIZER COMPANY

Originators and Manufacturers of Ring Crushers and Pulverizers

WRITE for Coal Crushing Bulletin

1119 MACKLIND AVE. • ST. LOUIS 10, MO.

"In designing for continuous transportation, most manufacturers are headed toward belt conveying."

In tracing the history of "continuous" mining, C. E. McWhorter, mining engineer, Goodman Mfg. Co., Chicago, Ill., pointed out that the art really is not new. It began early in the century with attempts to drive a tunnel through chalk under the English channel using a machine operating on the McKinlay principle. This was followed in later years by development of the Carson Smith-Harold Silver machine at Denver, using the ripping head principle later employed in Joy units. Goodman also is continuing development of one of these intermittent cycle units.

In describing other units, Mr. McWhorter singled out the Le Roi unit based upon BCR head design, which is planned for use in thinner seams. About 38% of the Nation's coal comes from seams less than 42 in in thickness, he noted. On long-walling, Mr. McWhorter voiced the opinion that the method will not generally be adopted here because of the large number of men required per unit.

Conveyors of many types have been developed, but manufacturers must hold back somewhat until the directions of mine design for continuous systems have been established. If long, straightaway runs become the accepted rule, then belt conveyors will most likely be employed. On the other hand, if traditional block systems are preserved, some system of entrained conveyors will be required, Mr. McWhorter explained.

Central Appalachian Section . . . From p 120

Bumps in the Pocahontas No. 4 Seam" was discussed by Woods G. Talman, general superintendent, U. S. Steel Corp., along substantially the lines of his article in *Coal Age*, January, 1955, p 69, and his paper at the American Mining Congress convention, *Coal Age*, June, p 85. It has proved practical, he noted, to drill loaded or heavily stressed blocks. Bumps can be triggered by drilling into loaded pillars without jeopardizing the safety of the men. By drilling 24-in holes, blocks formerly unminable have been recovered.

CONTINUOUS MINING

Production data from a Joy 1CM-2 continuous miner with Joy 30-in extensible belt and a 20-ft bridge conveyor at the Compass Coal Co. (Pittsburgh seam) in a section of the mine where clay veins are not excessively numerous and the work is development followed by immediate pillar recovery were given by J. S. Mathews, general superintendent.

With 2-shift operation, seven men per crew and a mechanic on the third shift, or an average of 7½ men per shift, production from the start on March 11, 1955, to May 31, 1955, was 52,253 tons. The highest tonnage per shift was 740 tons; lowest per shift, 54 tons; average per shift, 479 tons; maximum advance per

Parmanco

H-81-53

HORIZONTAL DRILL

Easily cuts drilling time
IN HALF

Completely Re-designed

- *with hydraulic feed*
- *horse power increased to 81 with "254" cubic inch engine*

Included in the new design is a sturdier frame, with the elimination of racks, pinions, and all mechanical power feed gearing. The four individually adjustable jacks make possible faster set-up and smoother drilling.

The H-81-53 drill is designed for drilling 5-6-8 inch holes to 100 feet or more. The greatly increased 81 h.p. engine in combination with the hydraulic feed makes possible the reduction of footage time by at least one half. All drive gears are totally enclosed. Power feed features direct hydraulic feed eliminating reduction gearing in hydraulic feed system.

This new drill—the very latest in design—is equipped with self-starter and generator, dual type front wheels, truck type rear axle with hydraulic brakes, and traction drive with both forward and reverse. Here is greater speed in retrieving augers and four rotating speeds and reverse for drilling and cleaning the hole. Here is accuracy and mobility. Here is the modern answer to faster, lower-cost drilling. Send for complete details.

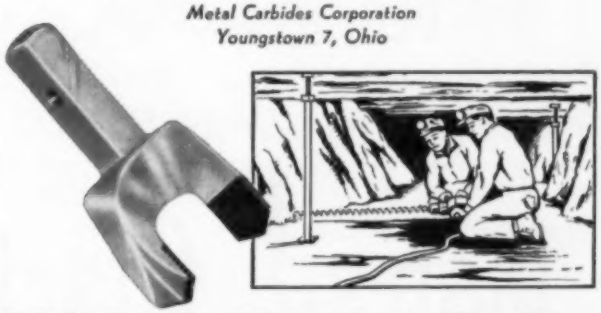
PARIS MANUFACTURING CO.

PARIS, ILL.

SUPERSET CORE BITS

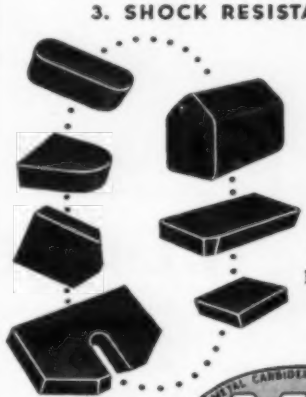
● Mining contractors, ore prospectors, coal operators and construction firms are realizing tremendous savings by taking advantage of our **exclusive fabrication service!** Contractors send us the necessary diamond stones from their own stocks—we hand set them in a super-hard tungsten carbide crown and braze to the threaded steel blank. Hand-set bits assure the proper positioning of each diamond stone to achieve maximum cutting efficiency. The carbide matrix holds the diamond stones until entirely used up. These advantages mean lower drilling costs to you. We can also supply complete core bits or salvage the stones from used bits at nominal cost. Supplied in standard sizes EX, EXE, AX, BX, NX, etc.

Metal Carbides Corporation
Youngstown 7, Ohio



Talide Tips for Mining Tools Give These 3 BIG ADVANTAGES . . .

1. EXTRA STRONG
2. SUPER HARD
3. SHOCK RESISTANT



● A complete line of low-cost, high-quality Talide Tips is offered fabricators and users for tipping machine bits, rock bits, drill bits, roof bits and open-pit bits. All Talide Tips have a special surface finish that facilitates brazing. Non-standard shapes and sizes quoted on request.

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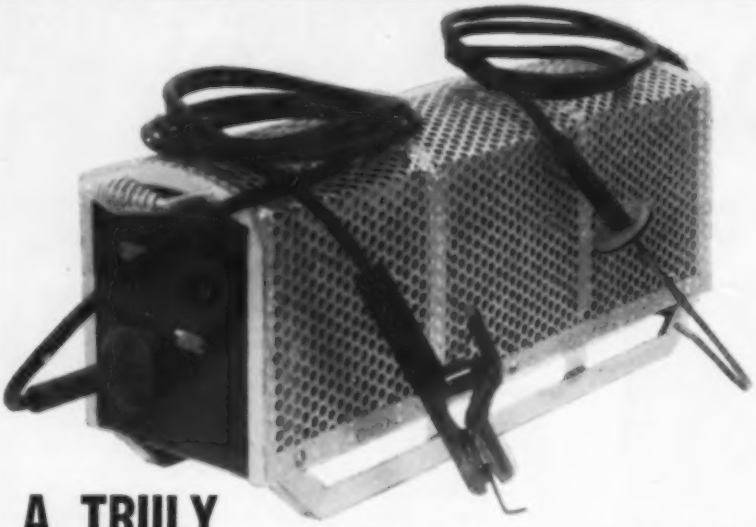

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ENSIGN *ELECTRIC & MANUFACTURING CO.*
914 Adams Avenue, Huntington 4, W. Va.

shift, 151 ft; and average advance per shift, 102 ft.

Screening percentages compiled from tests of five coal samples from conventional mining and eight from continuous mining show the following, in that order: plus 2-in, 30.10 and 31.50; 2x⅜-in, 39.10 and 43.20; and ⅜x0, 30.80 and 25.30.

In conclusion Mr. Mathews noted that most areas of the Compass operation have a soft bottom which, when wet, is almost impossible to travel with heavy mining equipment. In his opinion, therefore, "the combined use of miners and extensible conveyors is the nearest approach to actual continuous mining which is known today." Answering a question from the floor, he said the actual machine operating time has been about 5½ hr per shift.

ROOF MATERIALS

"Geologic Studies of Coal Mine Roof Shales in Illinois" by Jack A. Simon, geologist and head, Coal Division, Illinois Geological Survey, described his studies of roof materials—principally the gray shales from roofs in 80 mines and from a number of core drill holes in the Herrin No. 6 seam, which is the No. 11 seam of western Kentucky.

His relatively new approach to the problem of roof studies is concerned with fundamental mineralogic and petrographic structural materials. The primary objective at the initiation of the study was "establishment or formalization of criteria upon which to evaluate roof materials as the materials themselves may influence future mining conditions and as these materials may be seen in exploratory diamond drill holes."

Observations were made of all visible physical factors and since it was felt that a dominant factor in behavior was moisture, many tests were made, including water immersion, simple swelling, water absorption, size analysis of samples, and pipette analysis to determine clay, sand and silt fractions. Mr. Simon stated that his paper was a report on partial results and observations, but he concluded that with "such studies in combination with engineering studies and, with knowledge of practical experience, much additional progress can be made in the solution of roof problems."

BOLT RECOVERY

Use of an electric impact wrench instead of a manual speed wrench has raised the number of roof bolts recovered by a 3-man crew from 300 to 500 per shift, said J. William Bassett, West Kentucky Coal Co., in discussing "Roof Control in the Kentucky No. 11 Seam" (*Coal Age*, December 1954, p 130). One result was a reduction in the average cost of reclaimed bolts from 24 to 15c each.

When all units in the company's No. 11 seam mines are equipped to roof-bolt, and the recovery program reaches maturity, only 25% of the total bolts installed will be new. Roof bolts must be placed so close together and must be so long (up to 6 ft) that "the only salvation in this roof-control cost is a reclaiming program."

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$13,000 to $17,500

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P-6752 Coal Age
330 W. 42 St., New York 36, N.Y.

REPLIES (Box No.): Address to office nearest you
NEW YORK: 330 W. 42nd St. (36)
CHICAGO: 520 N. Michigan Ave. (11)
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Additional Positions Vacant Advertising on opposite page

Mining Engineer, graduate, 30-50, experienced in highly mechanized coal mining with good practical and theoretical knowledge of mine ventilation. Duties to include supervision of underground survey crews and map draftsmen, plans for development and exploration and mine projection. Applicant must be in good health. Salary commensurate with experience and qualifications such as professional registration. Location, Virginia. P-6943, Coal Age.

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Strip Coal Wanted
Lease or purchase—large or small tracts. Morgan Coal Company, 2850 North Meridian Street, Indianapolis 8, Indiana.

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ANYTHING within reason that is wanted in the field served by Coal Age can be quickly located through bringing it to the attention of thousands of men whose interest is assured because this is the business paper they read.

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Opportunities for well-qualified chemists for research and development in heavy aromatic chemicals. Experience in coal tar chemistry or related fields desirable. Emphasis on recovery and purification of aromatic chemicals and development of derivatives and uses. All degree levels will be considered.

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1—24"x24" Jeffrey single roll

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1—7½ HP Sullivan double drum electric
1—10 HP Sullivan 3 drum
1—Ingersoll-Rand 6HC air tugger
1—Ingersoll-Rand D6U air tugger
2—6½ HP Sullivan tuggers, 250V. D.C. single drum
7—6½ HP Sullivan 2 drum, 250V. D.C.
1—10 HP Sullivan 2 drum, gas engine driven

BOX CAR LOADERS
3—Ottumwa 20 HP box car loaders
2—Manierre 22 HP box car loaders
1—Jeffrey 20 HP box car loader
2—Red Devil portable loaders, 12" x 15"
1—Card portable loader, 11'x19"

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1—Link Belt, 50' centers, 12" flights
1—Jeffrey, 75' centers, 9" flights
1—Jeffrey, 67' centers, 30" flights
1—Jeffrey, 72' centers, 30" flights
1—Jeffrey, 80' centers, 36" flights
1—Jeffrey drag, 28' centers, 9" drags
1—Jeffrey drag, 28' centers, 30" drags

ROTARY DUMPER
1—Card Rotary car dumper, 13'x15' platform

ELECTRIC HOISTS
1—11 HP Vulcan, single drum
1—20 HP Vulcan,, single drum
1—22 HP Vulcan, double drum
1—25 HP Vulcan, single drum
1—30 HP Vulcan, single drum
1—37 HP single drum
5—50 HP single drum
2—60 HP single drum
4—100 HP Box single drum
1—112 HP Vulcan, single drum
1—150 HP Vulcan, single drum
1—150-225 HP Denver double drum
1—375 HP Box single drum

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2—11BU Joy loaders, 250V. D.C.
2—7BU Joy loaders, 250V. D.C.
3—5 BU Joy loaders, 250V. D.C.
1—61EW Jeffrey elevating chain conveyor
1—61HC Jeffrey chain conveyor, 90'
1—61W Jeffrey chain conveyor, 200'
9—G-20 Goodman shakers
6—G-15 Goodman shakers
8—Vulcan shakers
3—UN-17 Joy LaDel shakers
16—Goodman HA duckbills

MINING MACHINES
A.C.
1—7B Sullivan super shortwall
10—Sullivan CE7
1—CR3 Sullivan
1—28A Jeffrey
8—112A Goodman

D.C.
4—7B Sullivan super shortwall
2—T-1 Sullivan crawler type trucks
7—12AB Goodman
1—CH-11 Sullivan ironclad
1—29C Jeffrey arcwall

SCALES
3—100 ton Fairbanks railroad scales
1—125 ton Howe railroad scales

SCREENS
1—41"x68" Jeffrey-Traylor electric
1—48"x76" Jeffrey-Traylor electric
1—3'x8' Simplicity 3 deck
1—3'x12' Symons single deck
1—4'x12' Symons double deck
1—4'x12' Tyler Ty-rock 3 deck
1—2 deck shaking screen, 18'x86"
1—32'x84" 4 deck shaking screen

COAL CARS
89—60 cu. ft. Card steel, end dump, 36" ga.
80—66 cu. ft. Card steel, end dump, 36" ga.
48—150 cu. ft. Watt steel, end dump, 42" ga.
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1—Joy model 42D5, battery operated
4—Joy model 60D3P, battery operated
7—Joy model 60D1, battery operated

CAGES AND HEAD SHEAVES
2—Card automatic self-dumping cages
2—108" Card bicycle sheave wheels
2—96" wood filled sheaves
2—84" Card bicycle sheave wheels
3—72" bicycle sheave wheels

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1—108" Joy La-Del axial flow fan, model L-14
1—8H Jeffrey 42" aerodyne fan
1—7" Jeffrey aerodyne 2 stage fan
6—Joy axivane series 1000 blowers, 5 HP
1—Jeffrey #61 blower, 1½ HP
7—Jeffrey aerodyne midget blowers, 1½ HP
1—2600cfm Brown-Fayro blower, 1½ HP
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4—10 ton Atlas, 36" ga.

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1—8.2 KW G. E. 130/182 V., 15 HP motor, 440V. AC
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1—15 KW Elec. Prod. 132 V., 30 HP motor, 440 V AC
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1—40 KW Imperial 250 V., 60 HP motor, 440 V. AC
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Good Chief Mechanic
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Phone 315

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10 OPEN PIT MINE CARS
25 TON CAPACITY

NEW—Never Been Used
CARS MANUFACTURED BY SANFORD-DAY:

6'4" High from rail—Standard Gauge
7'9" Wide over all, 4 Door Drop Bottom
30'8" Long Bumper to Bumper

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5 cu. yd. Sauerman Power DRAGLINE SCRAPER
Comp. with hoisting engines, head posts, propelled car, etc. Good oper. cond. Loc. New Jersey.
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Locomotives, 5 to 80 tons, diesel, elec., gas.
Shovels, cranes, draglines, 1½ to 23 yds.
35-yd. diesel Tournarockers, Model E-50 (3).
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All types of Joy Cutters, Loaders, Shuttle Cars, Cat Trucks, Belt Conveyors, Chain Conveyors, etc. Includes:

JOY EQUIPMENT—rebuilt

1—Joy 12BU, 9E Loader, 26" hi. Rebuilt.
1—Joy 12BU, 7E Loader, bargain.
1—Joy 14BU, low pedestal Loader, 38J head motors.
1—Joy 14BU, 7BE Loader, 10 H.P. head motors.
5—Joy 14BU, 7CE, Loaders, 10 H. P. motors.
3—Joy 8BU, type 11E, Loaders.
1—Joy 3 JCM Continuous Miner, 34" hi.
4—Joy 32E9 Shuttle Cars.
2—Joy 32D Battery Cars.
2—Joy 42E13 Shuttle Cars.
3—Joy 42D Battery Shuttle Cars.
4—Joy 5SC Shuttle Cars.
4—Joy 6SC four wheel drive Shuttle Cars.
1—Joy T1 Standard Cat Trunk.
1—Joy T-2-5 Cat Truck, AC.
3—Joy T-2-5 low pan Cat Trucks.
1—Joy Ladel MTB 30" Belt Conveyor, 1000 Ft.
6—Joy Ladel 12" Chain Conveyors, 300 Ft.
2—Joy PL11-14 Elevators on rubber.
1—Joy PL11-5E Elevator.
1—Joy PL11-7E Elevators.
4—Joy 11B Cutting Machines, like new.
4—Joy 7B Cutting Machines, rebuilt.

LOCOMOTIVES

1—Goodman 6 ton, 24" hi, practically new.
1—Jeffrey 15 ton, type MH-110, 250 volt, 48" Ga.
5—Jeffrey 10 ton, type MH-78, 42" and 44" Ga.
2—Jeffrey 15 ton, Motor Units, 115 H. P. complete with trucks.
3—Jeffrey 8 ton, type MH-110, 42", 44", and 48" Ga.
12—Jeffrey 6 ton, type MH-58, 42", 44" and 48" Ga.
2—Jeffrey 4 ton, type MH-96, 42" and 48" Ga.
3—G.E. 4 ton, type 825 Locomotives.
10—G.E. 8 ton, type 801, 803, 821 Locomotives, 42", 44" and 48" Ga.
1—G.E. 8 ton, type 822 Locomotive, 44" Ga.
3—G.E. 10 ton, type 809 Locomotives, 42", 44" and 48" Ga.
8—Goodman type 33, 6 ton, 44" and 48" Ga.
2—Goodman 8 ton, type 32A, 44" and 48" Ga.
1—Goodman 10 ton, type 34B, 48" Ga.
2—Goodman 13 ton, type 29A, 44" and 48" Ga.
3—Westinghouse, type 902, 4 ton.
2—Westinghouse type 904, 6 ton.
1—Westinghouse, type 907, 10 ton.
6—Gasoline and Diesel Locomotives, 4 to 20 tons.

TIPPLE EQUIPMENT

2—Jeffrey 30" x 30" Crushers. New.
2—Double Roll Crushers.
3—Single Roll Crushers.
2—Cedar Rapids portable super Screening Plants.
1—Allis Chalmers 5' x 14' Rippflo Vibrator.
1—4' x 10' Robbins Gyrex Vibrator.
Feeders, Drag Conveyors and Loading Booms.

CUTTING MACHINES

1—Jeffrey 29U on rubber.
1—Jeffrey 29C on cats.
6—Jeffrey 35L's, like New.
12—Jeffrey 35B and 35BB.
3—Jeffrey 29B's on track.
2—Jeffrey 29L, track mounted.
4—Jeffrey 29C, track mounted.
4—Baby Goodman 212's, rebuilt.
3—Goodman 312 Cutters, 18" hi.
3—Goodman 512 EJ Cutters.
15—Goodman 12AA and 112AA.
2—Goodman 224 Slabbers.
3—Goodman 724 Slabbers.

LOADING MACHINES

12—Joy Loaders, all types.
1—Jeffrey 6I CLR on rubber, 26".
2—Jeffrey 43L Shortwall Loaders.
3—Jeffrey L-500 Loaders.
3—Goodman 360 Loaders.
4—Myers Whaley No. 3 Automat Loaders.

CONVEYORS

10—Jeffrey 6I HG Face Conveyors.
12—Jeffrey 6I AM Room Conveyors, 300'.
4—61EW Elevating Conveyors.
2—6I WH 15" Room Conveyors.
1—Joy 30" Belt Conveyor.
4—Joy Ladel UN-17 Shakers.
10—Goodman G-12½ and G-15 Shakers.

DIESEL PLANTS AND CONVERTERS

1—75KW, G. M. C. 6-71 DC.
2—Superior, 100KW, DC.
1—Cummins, 125KW, DC.
1—Allis Chalmers 200 KVA, AC (Natural Gas).
2—100KW, G. E. TCC-6 Rotaries.
2—150KW, G. E. HCC-6 Rotaries.
2—200KW, G. E. HCC-6 Rotaries.
1—200KW, Allis Chalmers Rotary.
1—300KW Westinghouse.
1—400KW, G. E. Rotary.
(All the above with 2300/4000 and-or 6900/13000 primary transformers.)
2—150KW MG Sets, G. E. & Westinghouse.
1—200KW, MG Sets, Westinghouse.
1—300KW, MG Sets, Westinghouse.

ROCK DUSTERS

1—MSA hi pressure on rubber.
1—MSA hi pressure on skids.
1—MSA low pressure Room Duster.
1—MSA hi pressure track mounted.
1—Canton Dustributor, lo pressure.
1—Canton hi pressure, track mounted.

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2—Brown Fayro HKL and HGD Car Spotters.
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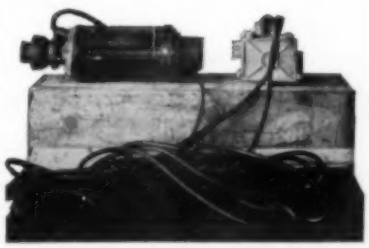

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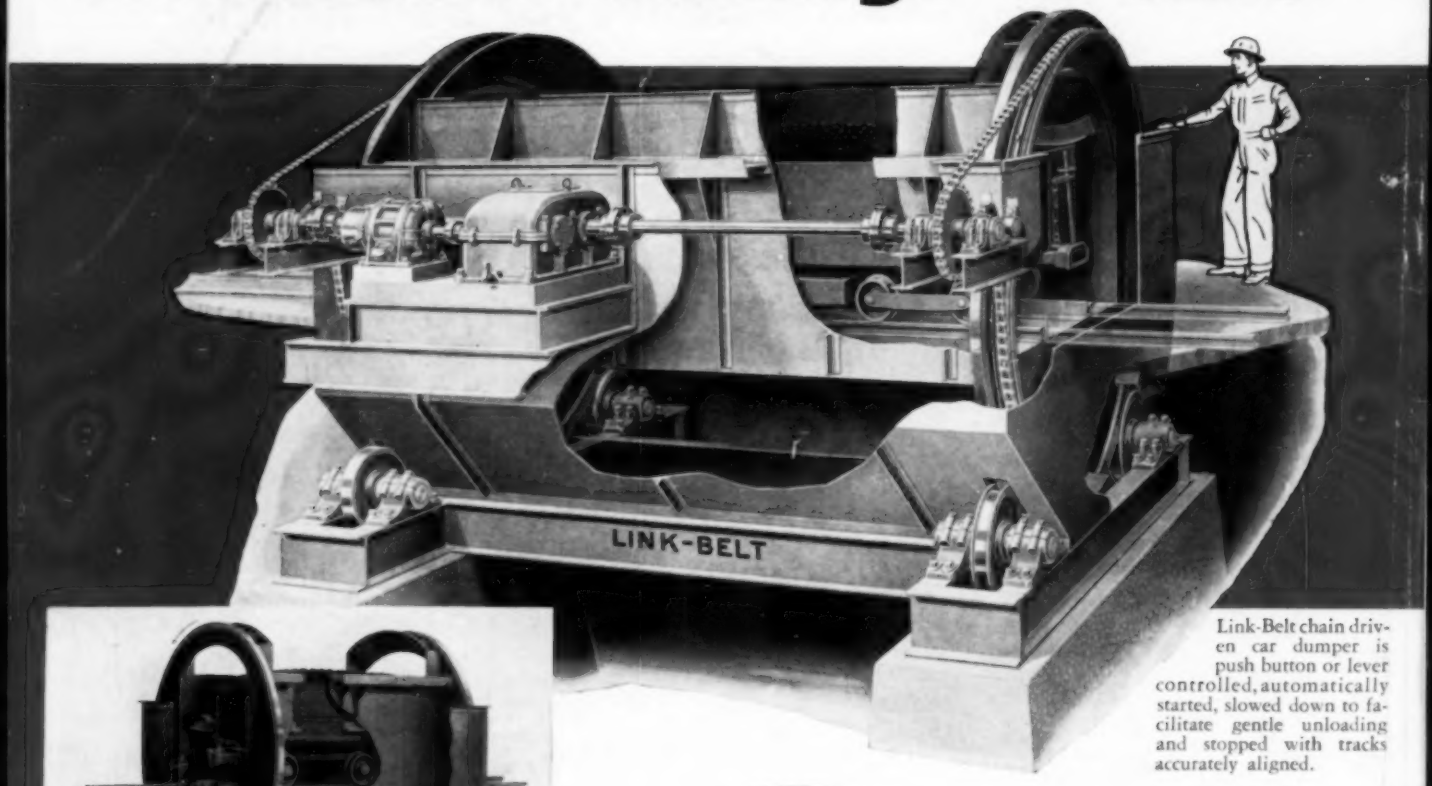
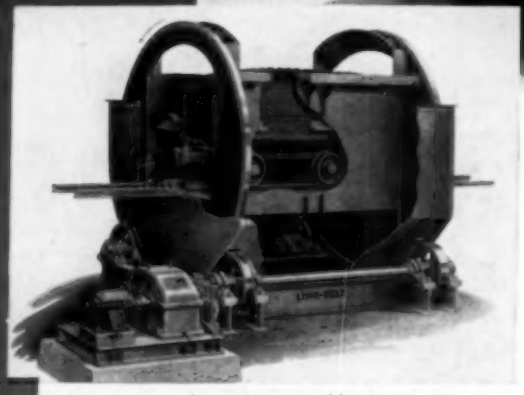


Link-Belt chain driven car dumper is push button or lever controlled, automatically started, slowed down to facilitate gentle unloading and stopped with tracks accurately aligned.



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